NATIONAL CAR BUILDER

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NUMBER 9.

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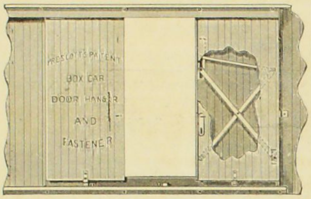

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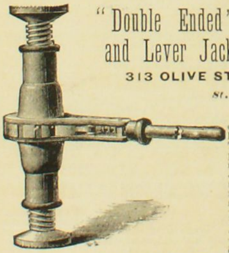

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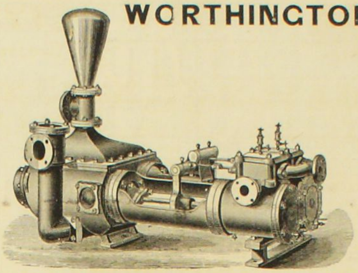

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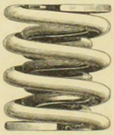

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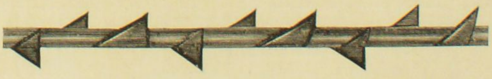

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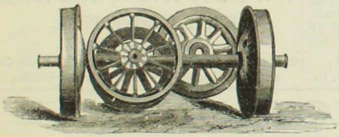

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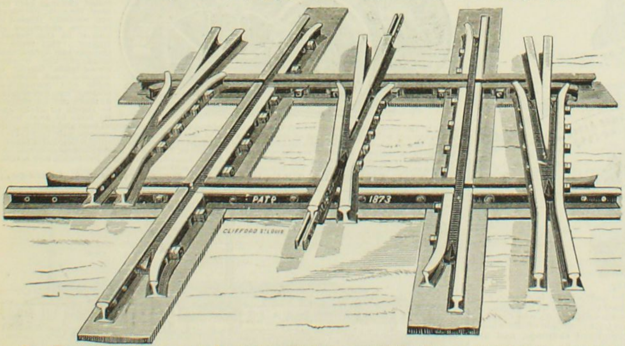

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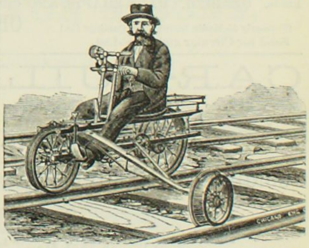

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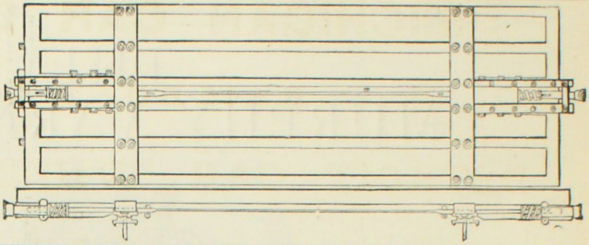

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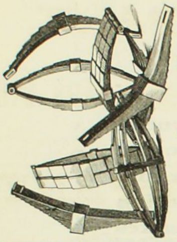

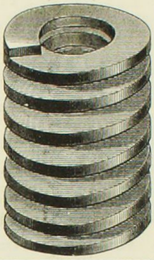

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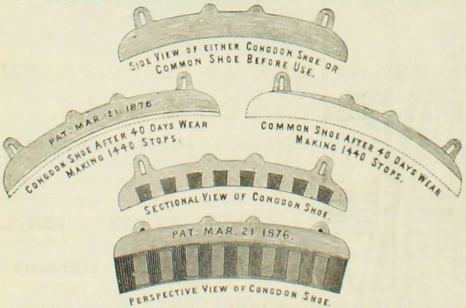

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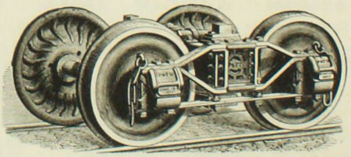

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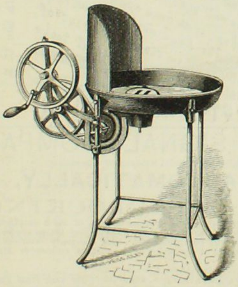

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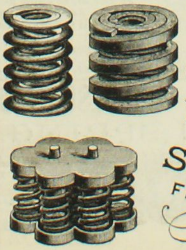

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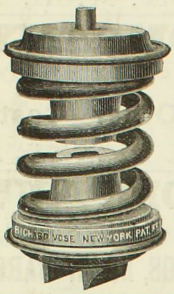
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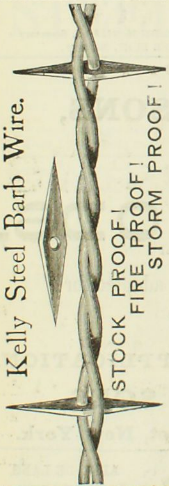

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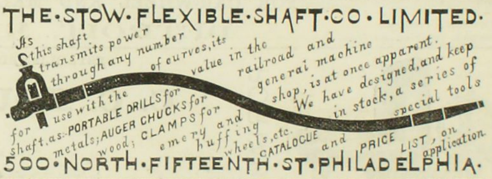

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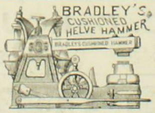

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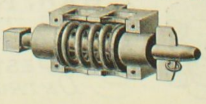

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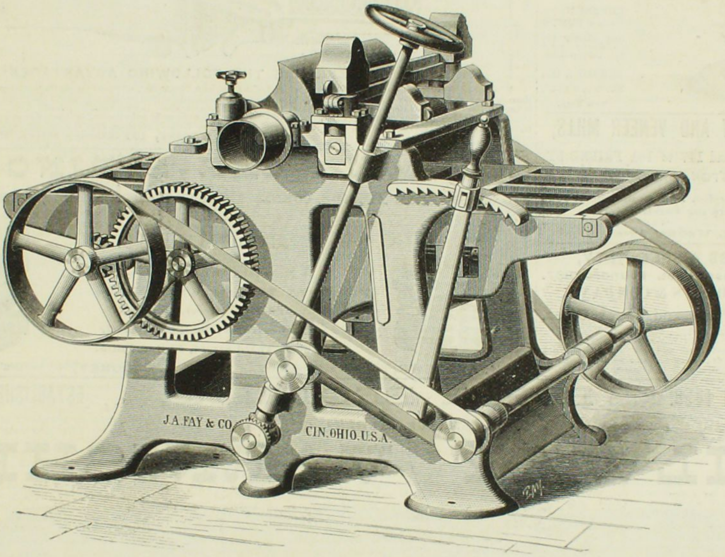

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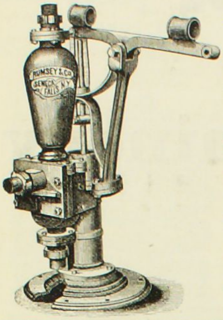

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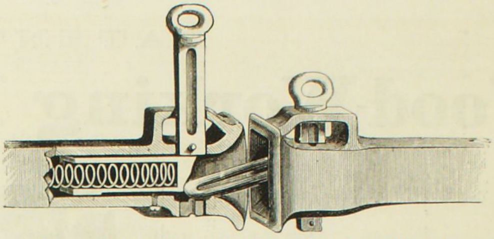

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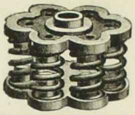

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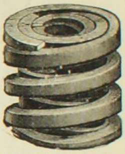

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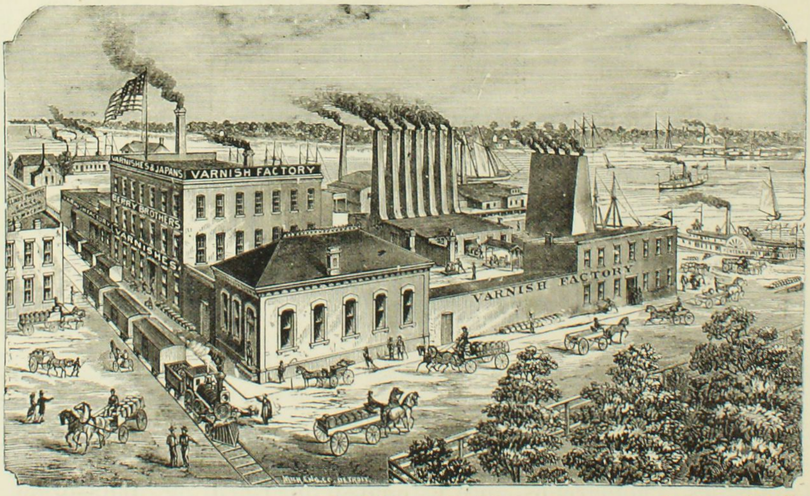

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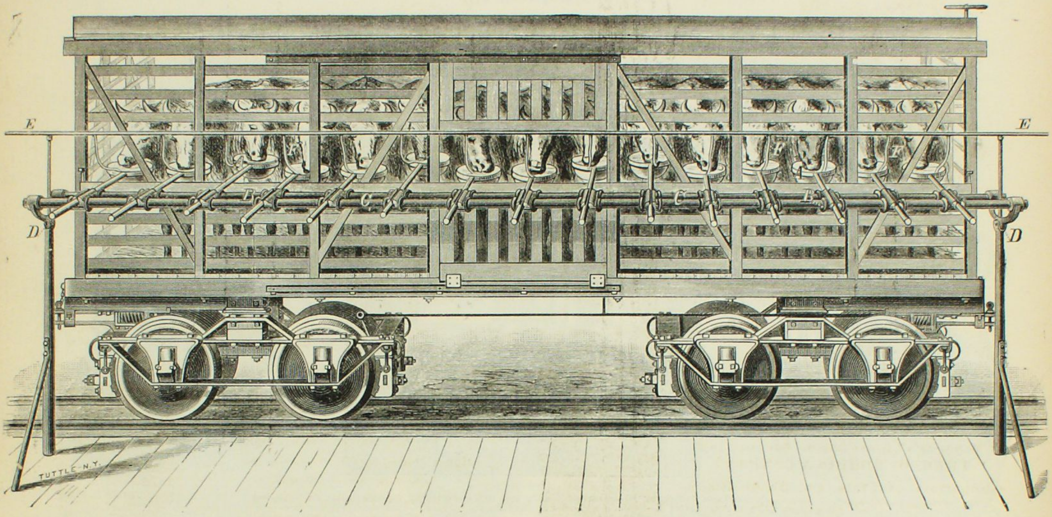
IN FEEDING AND WATERING, WITHOUT UNLOADING, LIVE STOCK IN TRANSIT.



The raising and shipping of live stock has grown to be a business of enormous proportions in this country, and affords handsome revenues to all parties interested in it—producers, middlemen and the transportation companies being chiefly benefited by its growth. The subject of proper transportation of live animals long distances, and giving them food, water and merciful care and attention on the route, is one which interests a much larger class—the consumers; for, aside from humane considerations, the condition of the flesh of animals brought to the shambles after a journey of many days, during which they have, through indifference and neglect, suffered untold agonies from hunger and thirst, is often such as to make it utterly unfit for human food.

This is a matter in which the dwellers in Eastern cities are vitally interested, for they pay the heavy penalties of sickness and disease caused by using meat rendered unfit for food by inhuman and cruel neglect of the animals during transportation. On this point note that the Cattle Commission of New York in their report say: "It became apparent to the Metropolitan Board of Health of New York, in New York City, that the alarming increase of obstinate and fatal diarrhœa in the metropolitan district was caused by the use of diseased meat." And they add: "Not only do Western cattle lose a hundred pounds or more per head in transportation, but the tissues of their entire system are turned into a feeble, disordered and feverish condition." Prof. Agassiz says: "Let us call your attention to the dangers arising from ill treatment of beef cattle before slaughtering them." Medical Inspector Hamlin says: "The flesh of mammalia undergoes great change by reason of fasting, disturbance of sleep and long-continued suffering, resulting in its not only becoming worthless, but deleterious."

The cruel and barbarous treatment to which animals in transit from the West to Eastern markets are frequently subjected is an old and long-standing abuse. It has been clearly stated and denounced for years as shameful, inhuman and uneconomical, but up to the present time there has been no substantial improvement in the means and methods provided over those of twenty years ago, when the business was begun.

There is, therefore, an urgent need for the introduction of some plan by which the needless suffering of these dumb creatures in transit may be lessened. But in any attempt of this kind, the humane side of the question is not the only one to be considered, and any one who on entering this field ignores the vested business interests involved will have his labor for his pains. This probably explains why, in spite of the denunciations of the transportation companies and shippers, no substantial reform has yet been accomplished. With the consideration of dollars and cents on one side, and that of sentiment on the other, the result may be safely predicted every time.

Whatever reform is attempted in this direction, therefore, must proceed from a rational consideration of the capital invested in the present system, or it will be unsuccessful. The plans or methods suggested must be such as to demonstrate that they do not entail considerable expenses without corresponding benefits in dollars and cents to those who must pay the bill.

Of all the plans that have been heretofore suggested, none have been adopted by the transportation companies, for the reason that the entire burden of expense was thrown upon them without equivalent advantages. It has been suggested, for example, that the railway companies should build cars of special and expensive design for this purpose, requiring the outlay of many thousands of dollars. It will be apparent that the companies cannot, and will not, carry out such plans without being paid for their investment, and they can only be paid by increased charges to the shipper, who, seeing only added outlay without adequate return, naturally opposes them; so the question has practically rested up to the present time.

It has been fully demonstrated by actual tests that, by feeding and watering live stock regularly every 12 hours between St. Louis or Chicago and New York, 50 pounds and upward in shrinkage was saved to each head of cattle, and the condition of the meat materially improved.

The following is a moderate estimate of saving to the shipper with eight feeding and watering stations between St. Louis and New York:

Allowing 16 cattle to each car, and a saving in shrinkage of 50 pounds per head, or 800 pounds per car, worth 8 cents per pound, we have a total saving to the shipper on each car load........	$64.00
Deduct cost of feeding and watering at 20 cents per head at each station........	25.60
Net saving to the shipper on each car load...	**$38.40**

From 10,000,000 to 15,000,000 of cattle, sheep and swine are annually brought from the far West to supply our cities and larger towns with meat, and for foreign export. It is estimated that six per cent. of cattle and about nine per cent. of sheep and swine (or nearly 600,000 head) annually die while in transit, and much of the flesh and fat of these animals is sold in our markets, either as meat or rendered into cooking lard. Of the cattle that live, many, by reason of starvation and cruelties inflicted while in transit and after, lose nearly a hundred pounds in weight from the sweetest and best part of the meat, and come out of the cars full of fever, or with bruises, sores and ulcers, and these, together with smaller animals, to which the loss and suffering are proportionately great, are all sold in our markets for food.

Prof. Gamgee states in the Edinburgh *Veterinary Review* that he has "known diseased cattle to be slaughtered, the beef of which had the appearance of being the best beef that a butcher can show, and yet pigs, dogs and ferrets died from eating it, and horses died from drinking the water into which the blood of one of these animals had run." From these facts it appears that cruelty to animals in transportation avenges itself upon the consumer, and that we shall never be secure against disease from eating poisonous meats until animals are properly fed and watered and thus brought in good health to the shambles. This can readily be done without materially adding to the expenses of transportation, and with increased profit to all concerned, by adopting the cheap, effectual and practical method shown in the engraving. It represents a plan devised by Mr. A. D. Tingley, of New York, who has had long experience, and has made a patient and careful study of the subject.

It is a simple device for feeding and watering, *entirely separate from the cars* and is erected about 12 hours' run apart, at suitable stopping-places along the track on both sides of the car. Its construction and use will appear from the following description, reference being had to letters in the engraving:

A represents a series of feed-boxes, with handles which slide back and forth in socket, *B*, and allow the feed-boxes to be pushed in and out of the car as desired. The sockets or supports, *B*, of the feed-boxes (through which the handles slide) slide sideways on the rods, *C*, giving a lateral movement to the feed-boxes to avoid posts and braces when the boxes are pushed into the car. *D* is a joint or hinge in the upright posts, which gives a slight rocking motion to the horizontal part of frame-work, allowing the feed-boxes to be slightly raised or lowered. *E* is the main water-pipe, and *F* represents small leaders from the main water-pipe to each separate feed-box. It is designed to build a row of these on both sides of the track, and thus get at the heads of the stock wherever they are. The only alteration required to be made in the stock-cars now in use is to loosen one board on each side of the car, head high, and support it on hinges and hooks, so that it may, by lowering, provide an opening for the feed-boxes.

This arrangement not only provides in a simple and inexpensive manner for the comfort of the stock, but permits of their transportation with greater dispatch since it avoids the labor and delay of unloading.

The operation is as follows: The cattle-train is run on a side-track between the two rows of feed-boxes which are filled and in readiness. An attendant walking along the side pushes in one of the boxes at each head, and after they have had sufficient time to eat, he turns on the water in the main pipe, and it is distributed to each feed-box by the pipes, *F*. When the stock is watered, the feed-boxes are withdrawn, and the train moves on. For swine and sheep, an arrangement similar to the above, but slightly modified to suit its purpose, is provided.

Where the railroads will grant the right and privileges, with proper restrictions, a full and complete feed-station will be erected without cost to the railroad company.

Railroad managers, shippers, dealers and parties who are interested in this subject are invited to address, for fuller information,

UNION LIVE STOCK FEEDING COMPANY,
113 and 115 Broadway, New York City.

WINSLOW'S SAFETY CAR STOVE,

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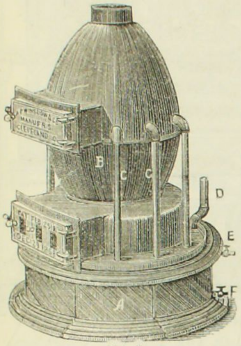
A. P. WINSLOW & CO., 89 Seneca St., Cleveland, Ohio.



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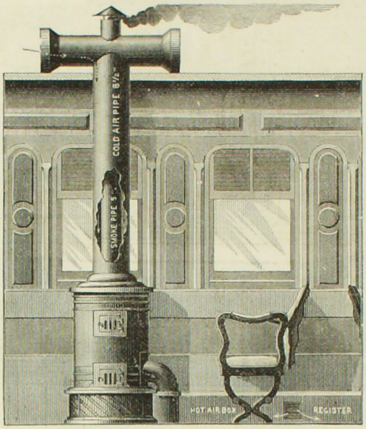

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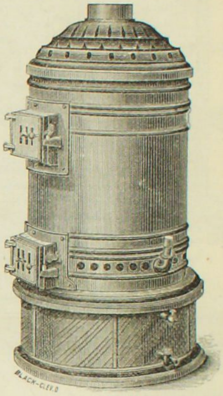


No. 2.

No. 1.—Stove without Jacket. Letter A.—Copper Tank containing 16 gallons of Water, and will immediately extinguish the fire when the car is overturned. Letter B.—Fire Pot. Letter CC.—Pipes leading from Tank into Fire Pot. Letter D.—Feed Pipe. Letter E.—Try Cock. Letter F.—Discharge Cock to empty Tank when required.

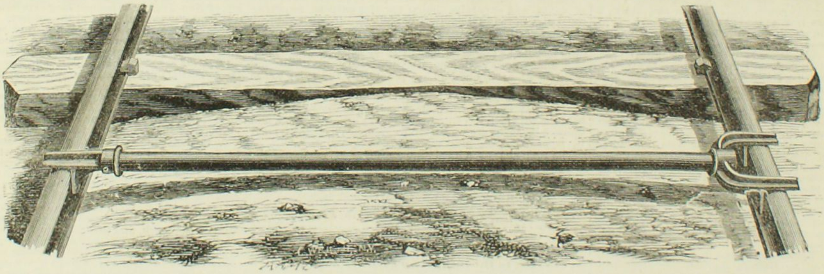
No. 2.—Stove as set up in car, and will burn either hard or soft coal or coke.

No. 3.—Designed for conducting hot air along the sides of the car, distributing same by means of the registers equally throughout the entire car, changing the air every three to five minutes, forcing the impure air out at the top of car—thus *heating* and *ventilating* the car perfectly.

It has proved a great success as a heater, on account of the very large volume of air heated.

It also fills the great desideratum so long sought for, *perfect ventilation* during the summer by discharging a constant stream of cold air through the registers, keeping car free from dust and cinders.

THE HUNTINGTON TRACK-GAUGE



is made with $1\frac{1}{4}$-in. iron pipes screwed with a tapered thread into malleable-iron heads, and is modeled so as to secure in a high degree the advantage of

STRENGTH, LIGHTNESS AND ACCURACY.

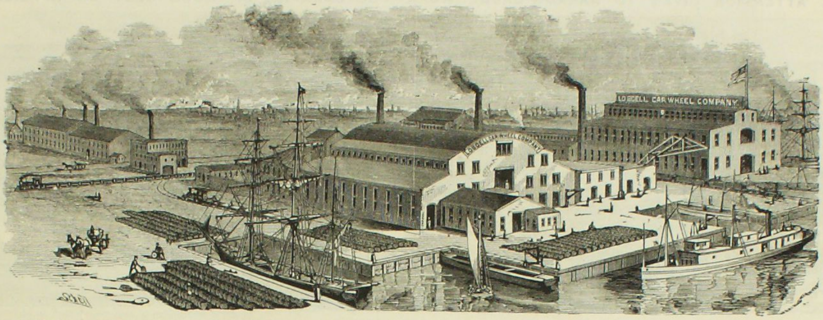
The forked end, which has two lugs which bear against the rail, secures a perfect gauge, even in the hands of a careless section-man, as it requires no judgment or correct eye to place the gauge exactly perpendicular to the rail, and it is also an important feature of this implement that even if it be swung as much as six inches out of perpendicular, it will not cause a variation in the gauge of more than one-thirty-second of an inch, whereas it is easy (and not uncommon) in using an ordinary gauge, to place it so carelessly as to cause a variation of from one-half inch to one inch.

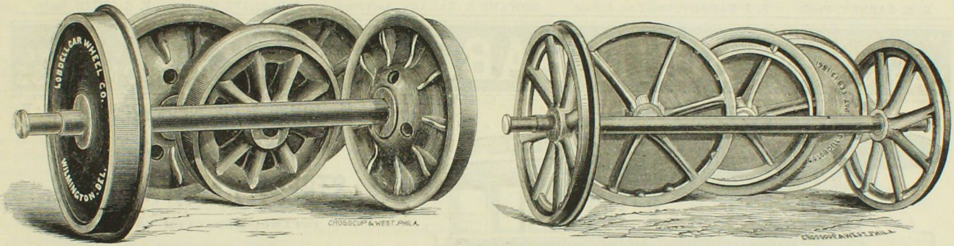
The Huntington Track-Gauge patent is owned by W. H. Boardman, John N. Reynolds and the undersigned, and from either of them gauges and any further information may be obtained.

R. M. VAN ARSDALE, 5 Dey St., New York.

LOBDELL CAR-WHEEL COMPANY,

WILMINGTON, DELAWARE.


LOBDELL CAR WHEEL COMPANY


LOBDELL CAR WHEEL CO.
WILMINGTON, DEL.
CROSSCUP & WEST PHILA.

Single and Double Plate, Double Plate and Wrought Spoke, and Hollow Spoke Wheels for City and Steam Roads. Wheels with turned treads, under Patent of W. W. Lobdell, guaranteed to give greatly increased mileage over ordinary Chilled Wheels. GEO. G. LOBDELL, *Pres't.* W. W. LOBDELL, *Sec'y.* P. N. BRENNAN, *Treas.*

SAMUEL HARLAN, Jr., Pres't. **J. T. GAUSE, Vice-Pres't.** **T. B. SMITH, Sec'y and Treas.**

THE

HARLAN & HOLLINGSWORTH COMPANY,

WILMINGTON, DEL.

ESTABLISHED IN 1836.

MANUFACTURERS OF EVERY DESCRIPTION OF

RAILROAD CARS.

BARNEY & SMITH MANUFACTURING CO.,

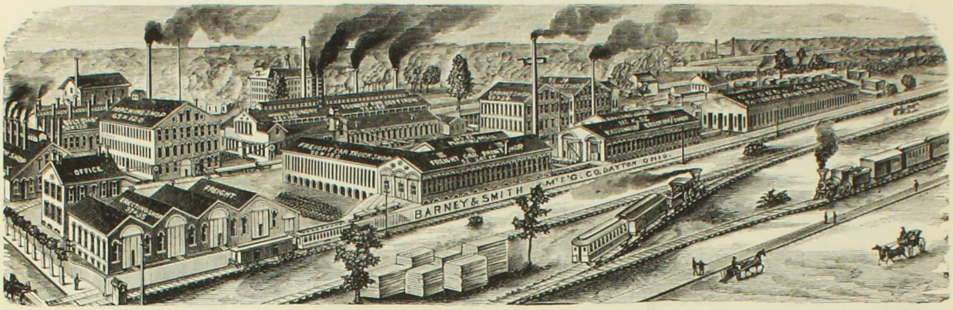
MANUFACTURERS OF ROLLING STOCK FOR RAILROADS, FROGS, CAR WHEELS.

Capital Stock, $750,000. Grounds Occupied, 18 Acres.
Capacity, 15 Freight Cars and 160 Car Wheels per Day.

AND ALL KINDS OF CASTINGS.

10 Passenger and Baggage per Month. EMPLOY 1,000 MEN.
Six Million Feet Lumber in Store.

SPECIAL ATTENTION GIVEN TO NARROW-GAUGE WORK—PHOTOGRAPHS OF WORK SENT ON APPLICATION.

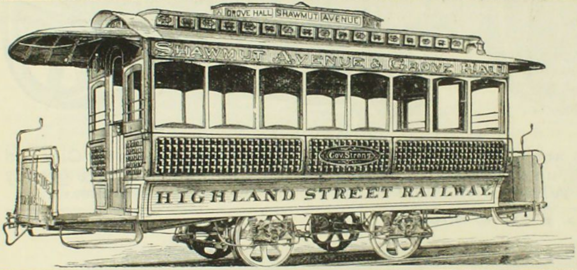

MACHINE SHOP 63×120
OFFICE
FREIGHT
ERECTING SHOP
FREIGHT CAR TRUCK SHOP
FREIGHT CAR PAINT SHOP
BARNEY & SMITH MF'G. CO. DAYTON OHIO.

E. E. BARNEY, Pres't. E. J. BARNEY, Vice Pres. & Supt. EDWARD E. BARNEY, Ass't Supt. J. D. PLATT, Treas. F. E. SMITH, Sec'y.

MANUFACTURERS OF
RAILWAY CAR
VARNISHES

JOHN BABCOCK & Co

NO. 2
LIBERTY SQUARE
BOSTON, MASS


GROVE HALL SHAWMUT AVENUE
SHAWMUT AVENUE & GROVE HALL
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HIGHLAND STREET RAILWAY.

J. M. JONES & CO., SCHENECTADY, N. Y.,

MANUFACTURERS OF

STREET RAILWAY CARS.

ESTABLISHED OVER 40 YEARS.

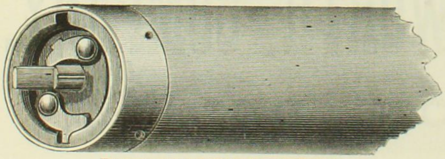
OUR CARS HAVE

ALL LATE and VALUABLE IMPROVEMENTS,

Are noted for Light Running and Easy Riding, Combining Lightness and Strength with Beauty in Design and Finish. Our Large Facilities enable us to Fill Orders Quickly, and at the Lowest Prices for Superior Quality.

HARTSHORN'S SELF-ACTING SHADE ROLLERS.

This cut shows the Roller end with the pawls attached, as it appears when not in motion.



Be sure you get Hartshorns' Rollers.

SOLD ALL OVER THE WORLD.

SPECIALLY ADAPTED TO

Railway Cars and Road Carriages.

Carry Shades of any Size or Weight. Do not get out of order.

ALL ROLLERS WARRANTED.

USED ON MANY OF THE PRINCIPAL RAILROADS THROUGH THE COUNTRY. MODELS AND CIRCULARS FREE.

S. HARTSHORN, 486 Broadway, N.Y.

A. T. STEWART & CO.,

MANUFACTURERS AND IMPORTERS OF

PLUSHES, BLANKETS,

CURTAIN MATERIALS, Etc.,

IN GREAT VARIETY, FOR

SLEEPING, PARLOR and DAY COACHES, at LOWEST MARKET VALUES.

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JOHN T. LEWIS & BROS.,
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PURE
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TRADE MK.

JOHN T. LEWIS & BROS.,

No. 231 South Front St.,
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MANUFACTURERS OF

WHITE LEAD, RED LEAD,

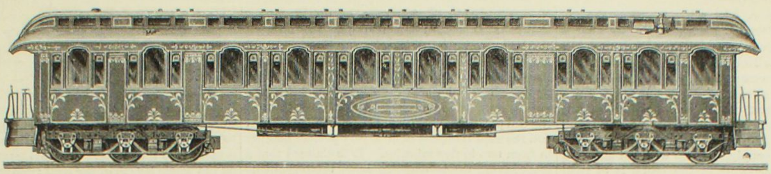
LITHARGE

ORANGE MINERAL,

Linseed Oil,

AND PAINTERS' COLORS.

THE NATIONAL CAR-BUILDER.



DEVOTED TO THE INTERESTS OF RAILWAY ROLLING STOCK.

VOLUME XI.
NUMBER 9.

SEPTEMBER, 1880.

SINGLE NUMBERS, TEN CENTS
$1.00 PER ANNUM.

Miscellaneous Items.

MR. GEO. H. NETTLETON, General Manager of the Kansas City, St. Joseph & Council Bluffs road, has tendered his resignation, which was accepted. This was in consequence of the transfer of the road to the Cnicago, Burlington & Quincy.

THE Louisville & Nashville has contracted with the Edgar Thomson Steel Company for 12,000 tons of steel rails, to be delivered during 1881.

THE Pullman Palace Car Company is building six first-class sleeping cars for use on the New York & New England Railroad when its new route shall be open between New York and Boston.

THE Port Hope Car Works, at Port Hope, Ont., were burned down on the night of Aug. 8. The loss is estimated at $40,000, on which there is only a small insurance.

THE Boston Equipment Co. has been organized with $250,000 capital stock, and will build shops at Canton, O., for the manufacture of cars.

THE Portland Co., at Portland, Me., is building a number of box cars for the European & North American road. They are built to carry 15 tons each.

THE Boston & Albany Co. is building a car shop 300 by 60 ft., and a blacksmith shop 30 by 60 ft. at East Albany.

THE Tredegar Works, in Richmond, Va., are filling several large orders for freight cars, chiefly for Southern roads.

THE Boston & Albany Railroad Co. is building at its Allston shops six new passenger day cars and two drawing room coaches. The latter have six-wheel trucks, 42-inch paper wheels and steel axles. The inside finish is mahogany; chair seats only are used. There is a smoking compartment and no state rooms.

THE LaFayette Car Works, in LaFayette, Ind., have been busy from the start last March, having turned out over 400 freight cars, and having orders on hand for 350 freight and a number of caboose cars. Among recent orders filled have been 15 narrow-guage cars for the Springfield, Effingham & Southeastern; 89 coal cars for the Peoria, Decatur & Evansville, and five flat cars for the same road, made extra heavy (for ballast) with 28 in. wheels.

THE largest shipment of railroad cars ever made at Wilmington, Del., in one day took place Aug. 14, when 29 cars were sent to the New York, Woodhaven & Rockaway Railroad, of which the Jackson & Sharp Co. shipped 13; Bowers, Dure & Co. 10, and the Harlan & Hollingsworth Co., 6.

THE Cleveland (O.) Bridge & Car Works are building 150 box cars, to carry 15 tons each, for the New York, Pennsylvania & Ohio; 20 extra heavy flat cars for the Cleveland Rolling Mill Co., and three street cars for a road in Cleveland.

THE Marshall Car & Foundry Co,, at Marshall Texas, has its new buildings nearly ready for use. The foundry is in operation and at work on car wheels. The company will build freight cars only.

MAJOR JOHN E. SIMPSON, General Manager of the Terre Haute & Indianapolis Railroad (the Vandalia Line) died of paralysis at the Lindell Hotel, in St. Louis, August 2. He was only forty years of age.

THE Toronto, Grey & Bruce Railway, of Canada, which has proved unprofitable and failed to pay the interest on its bonded indebtedness, is to have its gauge changed from 3 feet 6 inches to 4 feet 8½ inches, and when this change is effected it will probably be operated as a part of the Grand Trunk system.

THE New York & New England Railroad Company has completed plans and specifications for twelve new depots, to be erected west of Hartford, Conn. All are to be of wood, and about 200,000 feet of chestnut timber will be used in the construction of the platforms alone. The total cost is estimated at about $30,000.

THE terminal facilities of the Rock Island & St. Louis Division of the Chicago, Burlington & Quincy Railroad, at East St. Louis, have just been enlarged and improved. They have built a new brick freight depot, 500 feet long, with commodious offices and all the appliances for handling freight; extensive platforms, tracks and yard room for some 1,500 cars, and accommodations for the loading of 800 cars at one time.

The Pennsylvania Railroad Company are about to erect at Philadelphia, Pittsburg, Altoona, Harrisburgh, Columbia, Jersey City and other points along the line of their road, a number of buildings for the accommodation of their train hands. Each building will contain a waiting-room, dormitories, wash and bath rooms and a large reading-room, supplied with daily and weekly newspapers and periodicals.

A new and rather novel experiment which is being made on the Eastern railroad this season is the running of a special chair car between Boston and Gloucester, for the accommodation of business men who go in every morning and out every evening. It contains 45 chairs, which are sold for the season for $36 each, being the same as charged for the season-passage ticket. These are for the season the exclusive property of the purchaser. The experiment has proved very popular, all the chairs having been sold early in the season. The car is not an expensive one, but is built with most sensible regard for comfort and cheerful effect, and is unquestionably a good investment.

The Illinois Central is testing the Berney smoke consumer, manufactured by the Globe Valve Company, of Boston, and the Orvis smoke consumer, of Pittsburg. The Chicago & Northwestern is testing the Amory patent, another Boston device. The latter device seems to work well when the fire-box door is closed, but does not prevent the escape of smoke when the door is open.

The business of the Grand Trunk is developing so fast that the car shops at Montreal have been enlarged to meet the demand for additional rollin stock. An average of one locomotive a week is turned out at present. Fifteen hundred mechanics are employed. The receipts of the road last week were $56,000 in excess of the corresponding week of last year.

The first engineer of the Rhenish Railway, which has the longest experience in steel rails, has made a calculation, according to which the average duration of steel rails, where 24 trains pass over them every day, is 30 years, while that of iron rails, with a traffic of 17 trains, is 11 years. Steel rails, according to this calculation, last four times as long as iron rails, although they are but one-third more expensive.

Henry R. Worthington is erecting a new building in connection with his extensive works, for the manufacture of steam-pumps, water-meters, etc. at the corner of Rapelyea and Van Brunt streets South Brooklyn, N. Y.

A NEW signal for communication between the conductor and the engineer, to take the place of the bell-rope, is being tested on the Pennsylvania Railroad. It is connected with the automatic air-brakes. A light cord runs along one side of each car, a slight pull on which operates an air-whistle on the engine, while a slight escape of air in the car-attachment assures the conductor that his signal has been heard, thus avoiding the necessity of the engineer responding by the steam-whistle. It also saves the trouble of connecting and disconnecting the bell-rope in shifting cars, the connection with one car to another being made through the hose-coupling of the air-brakes.

A LOCOMOTIVE of rather unusual shape is building at the Concord Railroad repair shop at Concord, N. H. The boiler, instead of being round is flat—some 2 feet thick by 7 wide and 12 long—the tubes running horizontally; this boiler rests over the fire-box and in the middle of the locomotive, the engineer's position being in a little cab, similar to a wheel-house on a steamer, at the forward end, while the fireman's position is at the opposite end as now, the whole "machine" being considerably longer than the largest used at present. The inventor is a young man by the name of Stevens, whose name this novel locomotive will bear. The greatest idea is the economy of fuel, the boiler being flat, and covering over so much of the fire-box, while the water will in no case be to any great depth as now. The invention was shown J. H. Pearson, one of the largest shareholders, who was so pleased with it that he made arrangements to have one built for trial. It will be several weeks before this engine will be finished, and should it meet the expectations of its friends it will be quite a departure from the present style of locomotive.

A NEW officers' car has just been completed at the Elizabethport shops of the Central Railroad of New Jersey, which is thus described: Upon entering the car, the visitor finds himself in a large sitting-room furnished with a handsome black walnut parlor suite trimmed with silk. The floor is covered with Brussels carpet. Leading from this room is a long hallway, on one side of which are four sleeping compartments, furnished with small but costly sleeping and toilet appurtenances. Behind these apartments is the kitchen, which is fitted with a large range that takes up the entire end of the car. Pipes lead from the kitchen to the sleeping-rooms, supplying them with hot and cold water. The joiner-work in the coach is of light wood, with black walnut trimmings. Attached to this car is the dining-room coach, which contains a large dining saloon, the principal appointment of which is a long table that will accommodate twenty-four persons. Behind this is a store-room, fitted with a large refrigerator, water-tank, and carving table.

THE Baltimore *Sun* says that ten new passenger cars are nearly completed in the workshops of the Baltimore & Ohio, and that thirty of the new refrigerator cars are completed, and twenty more are under way. These cars are 29 feet length of body, 8 feet 4 inches in width, and 7 feet high. They weigh 25,600 pounds each, and have a carrying capacity of 40,000. Each car has two sets of doors, which keep the air out. The flooring is sandwiched with sawdust, as are also the walls. At either end is an ice-box reaching from floor to ceiling, and capable of holding about 1,000 pounds of ice. The exterior is painted a bright yellow with black edgings. On each side is a large letter "R.," which is an abbreviation for refrigerator, painted black within a red diamond. The company has just built a number of stock cars, all equipped with the Loughridge air-brake, and a part of them of the Patterson patent. A recent trial of the Patterson car is stated to have given entire satisfaction.

THE fast passenger locomotive which was built by the Baldwin Locomotive Works to run between New York and Philadelphia at the rate of 60 miles per hour has been bought by F. W. Eames of Watertown, N. Y., for brake trials and tests in England. It will be immediately fitted up with the Eames duplex automatic vacuum brake, and shipped to London. Mr. Eames proposes, while showing the action of the Eames brake on railway trains at the highest speed possible to attain, at the same time to settle the vexed question of the relative superiority of American and English locomotives.

RESPECTING the manufacture of the toughened glass sleepers, which have attracted so much attention by reason of the novelty of the application, it is stated that the clamps and other metallic attachments are put in red hot, while the glass is still fluid, and that when cold the glass and iron hold rigidly together. There is little fear of the cracking of such a joint, as the mutual expansibility of glass and iron differs very little. The cost of this toughened glass is, weight for weight, about the same as cast iron; but, as the glass is only about one-third as heavy as the iron, it is evident that for equal dimensions the cost of the glass will be only about one-third that of iron.

"ELECTRICIAN" asks: "How is the intensity of light measured, and what constitutes a 'candle-power?'" There is about as much vagueness in the expression "candle-power" as there is in that of "horse-power," but in both instances they are the recognized and uniform bases of comparison. The candle-light referred to in photometric tests is the light given out by a sperm candle burning 120 grams an hour, the candle being accurately weighed before lighting, and again after it has been burned a given period of time, to obtain its luminosity at the given rate of consumption.—*Age of Steel.*

AN ingenious arrangement for sharpening files by sand-blast has recently been put in operation by Master Mechanic W. A. Foster, of the Fitchburg Railroad. It consists of a steam-pipe leading from the boiler and a small hose connecting a vat of water in which fine foundry sand is mingled, with the steam-pipe. When the steam is admitted to the pipe, the water and sand are drawn into the pipe by suction and discharged with great force at the end of the pipe. The file is held in the blast, and the sand sharpens it in a very perfect manner in from two to five minutes. It is claimed that a great saving can be made in large establishments where many files are used, as the cost of recutting a file is about half the cost of a new one, and the apparatus leaves the file in better shape than when recut. A file can be sharpened several times without recutting.

THE mineral wool plant at Greenwood Iron Works, Orange County, N. Y., has been worked to its full capacity for the past six months. The Pennsylvania Railroad Company has now in use over 300,000 pounds of this material, most of it for deadening floors of passenger cars, and recently ordered 126,000 pounds more for early delivery. Among other large orders recently filled we note a sale of 35,000 pounds to the St. Louis Water-Works, for boiler and pipe covering; a car load of 22,000 pounds each to the Barney & Smith Manufacturing Company of Dayton, Ohio, and the Cincinnati Gaslight and Coke Company, several lots to the Edgar Thomson Steel Company, and Gautier Steel Company, limited, and two carloads for the deadening of all floors in one of the finest residences of Fifth avenue, New York, now nearly completed.—*American Manufacturer.*

THE usefulness of check-chains, says the *Railroad Gazette*, was shown quite clearly in an accident on the Lake Shore & Michigan Southern Railway on the 7th of June last. A passenger train ran through an open switch into a freight train standing on a side track, and a post-office car was thrown off the track into a gravel embankment, the wheels outside of the rails being embedded in the gravel, the others on the ties, and the body of the car leaning over as far the check-chains would permit. But chains held it fast and prevented the car, with the five men in it, from rolling over.

OF 279 patents issued during the week ended July 6, 22 were inventions especially intended for railway use. The number of railway patents issued each week ranges from 10 to 30, a fact which must leave no room for fear that progress in that direction is not keeping pace with other material interests. A large majority of these, however, possess little or no real value.

THE cheapest service in the world is that rendered by the great railways of the United States in transporting freight. During 1879 the average rate per ton per mile received by thirteen trunk lines was only one cent and two-hundredths, while on several of these roads the average was below eight-tenths of a cent, the Lake Shore & Michigan Southern going as low as sixty-four hundredths of a cent. Ever since 1873 the annual average has been downward, and that without compulsion by legislatures.

WOOD-CENTERED CAR-WHEELS, which are used in very large numbers for the passenger cars of English and all Continental railroads, have been found unequal to the duty enforced upon them by the higher strains due to the use of continuous brakes. An ingenious English engineer, has, however, succeeded in rendering them fit for service under existing circumstances, by changing both the construction of the nave and the bars. The latter is now made with a number of arms extending to within a short distance of the tire, which do not prevent a close fitting of the wooden segments. Another improvement on the ordinary method of construction in this case consists in having the tire formed with a groove for the retaining-ring. The main advantages claimed for wooden-centered wheels are a decreased wear of axle and tire—claims which, it is said, seem to be borne out by comparative experiments made with different woods.

THE station house of the Fitchburg Railroad, in Boston, has been thoroughly overhauled and handsomely finished inside. A new and elegant station has just been finished at Belmont, which is an ornament to that place. Improvements are going on the whole length of the road; gangs of men are working all the way on the upper part preparing to lay a double track where one is not already laid. The freight has increased wonderfully, and they are now running trains nearly all night, a very great amount of ocean freight being shipped. There are also three trains per day from Boston to Saratoga, in seven hours and twenty minutes. New chair cars of elegant pattern have been put on the line.

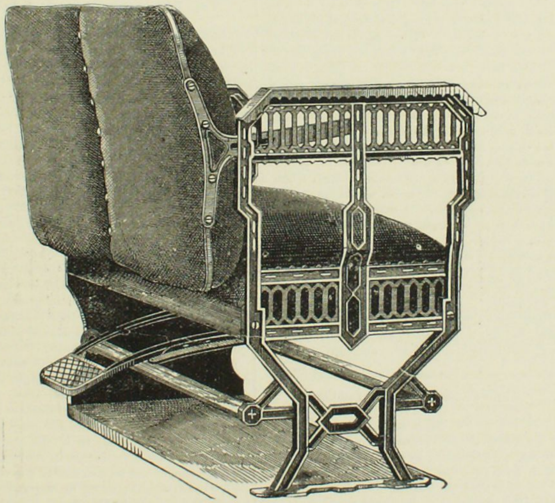
THE Westinghouse Continuous Brake Company of London in a circular issued July 28 says: "After experimenting for several years at great expense, both here and in America, we have perfected a system for lighting railway carriages, in which the air used for the brakes plays an important part. By a suitable regulating valve, air at the high pressure necessary for working brakes is reduced to a constant low pressure, and then passes through a small iron box filled with sponge, which is saturated with hydro-carbon (gasoline). The air issues from the box, charged with hydro-carbon, and passes thence to the burners, where a beautiful white light is produced. The cost of the light is much less than that of the present crude system, while the light is sufficient to enable travelers to read fine print in any part of the compartment. In addition to the brake and light, we have also perfected through the same medium a simple and cheap communication for passengers."

THE Lebanon Manufacturing Co., at Lebanon, Pa., is shipping new box cars to the New York, Lake Erie & Western road.

◆

The Woods of Tennessee.

A lecture delivered in Chattanooga, Tenn., by Col. W. A. Hoskins, contains some interesting information in regard to the different kinds of valuable timber to be found in the vast and primitive forests lying east and south of that point. Within a distance of forty miles to the southeast, at an elevation of 4,000 feet above tide-water, is found the Norway or white pine, so valuable for its strength and lightness, and so universally used for a great variety of constructive purposes. The hemlock is also found in great quantity upon these high elevations, growing to a great height and size, and much valued for architectural uses, especially for joists, sleepers, rafters, etc. It is strong, and not liable to warp. The black walnut, wild cherry and sugar maple of the finest quality, also abound in the coves of the northwest slopes of the Unaka Mountains. The high estimation in which these woods are held for manufacturing purposes will ere long cause them to be utilized, and give employment to thousands of laborers and artisans. Black walnut is increasing in value from year to year, and has become so prized abroad as to be an important article of export. The yellow or pitch pine is also abundant, and is distributed very generally over the country, except in the rich bottom lands. It grows to a great size and height, and is becoming more and more prized for bridge-building and other uses. The yellow and white pines, however, do not compare in extent of growth and commercial value with the long-leaf pine of northern Georgia and Alabama. Forests of these trees covering thousands of acres may be found in this locality, with scarcely a shrub of any other growth to be seen. Their trunks will cut on an average 80 feet in length and 36 inches in diameter. It is a timber which is much used in car-building, and is especially valuable for bridges, on account of its great strength, durability and length of stick. Next in order are the white and yellow poplars, which occasionally grow to the extraordinary size of nine feet in diameter. The wood is soft, is easily worked, takes a good finish, holds paint well, and is very durable, especially the yellow kind. Both are largely used for building purposes, pipe and pump making, cabinet work, and for a variety of useful articles. It is abundant and easy of access in the district named. White oak is also in abundant supply. It is not confined to any particular locality or soil, but grows in the valleys and on the slopes and on top of the mountains. It is largely used for railway ties, and at a comparatively low cost. Great quantities of rough staves of this timber are got out and shipped down the Cumberland and Tennessee rivers to New Orleans, where they are baled and sent to France and other wine-producing countries of Europe to be made into casks. These valuable forests, rich in every variety of wood indigenous to 35 degrees north latitude, will in a few years be culled out along the existing lines of railway, and new lines will doubtless be projected and built to reach the timber localities that are now inaccessible.



CREAMER'S IMPROVED CAR SEAT FOOT-REST.

THIS improved attachment to ordinary car seats is especially convenient for ladies, as it is well known that the present foot-rests are out of their reach to a very great extent. The cut shows the rest in its position next the side of the car, and attached to Creamer's new Queen Anne seat frame. They may be placed under every seat, or under each alternate seat, as may be desired, and, being reversible, may be drawn out either way, fully or partially, as may be most convenient for the sitter. So far as a practical trial has been made of them they have been found very useful in promoting the comfort of passengers. They are furnished, japanned and ready for attachment, for one dollar each, and can be put under the seat in a few minutes. The patentees and manufacturers are W. G. Creamer & Co., 96 John street, New York.

Railway Ties and Telegraph Poles.

But few people comparatively have any idea of the amount of timber used in the construction of a single railroad. We hear that our forests are rapidly disappearing, and we know that material for building and fuel causes the sacrifice of many leafy monarchs of the forest ; yet only the initiated knows that it yearly takes 200,000 acres of forests to supply cross-ties for the railroads of the United States. We interviewed a gentleman who has been in the business for thirteen years, and concluding that his observations and experience would be of interest, we give the substance of his talk : It takes 15,000,000 ties to supply the demand on our railroads, for which, on an average the contractors get 35 cents apiece, making in the aggregate $5,250,000. In building a new road the contractors figure on 2,700 ties to the mile, while it takes 300 ties to the mile to keep a constructed road in repair. Contractors, of course, buy pieces of timber land as near to the proposed line of road as possible, paying for the timber an average of $20 per acre, or giving the proprietor of the land ten cents for every tie got out. The average of a good piece of timber land is 200 ties to the acre and twelve ties to the tree. The size of a cross-tie differs on different roads, but the usual size demanded is 8 feet 6 inches long and 8 inches face. White or burr oak is considered the best timber for the purpose, although cherry, maple, ash and even locust have been used. The last named were first used on the Little Miami railroad, and after a time thrown aside as unfit for the purpose. Railroad men much prefer ties hewn out with an ax to those sawed in a mill, and many contend that the first named will considerably outlast the sawed ties. This theory is probably a fallacy, as sawed ties have been placed alongside of hewn ties, and remained sound twice as long. This business gives employment to an army of choppers, who are paid ten cents apiece for each tie. A continued practice makes the choppers expert in the use of the ax, and a single man has been known to get out 35 ties in a day ; yet the average is only 10, while an expert will probably get out 20. During the war, when ties sold at from 50 to 65 cents, choppers were paid 12¼ cents apiece. Although the contractor gets 35 cents apiece from the railroads for each tie, still there is a loss of from five to seven per cent. on dockage and stealage. An inspector is sent by the company to inspect the ties. This is generally a clerk from some of the offices, who frequently knows but little as regards the strength or durability of timber, and, as a consequence, some of the best ties are docked and only bring twenty cents apiece. The stealage is where the section men put in new ties which have not been inspected and received, and fail to report the use of the same to the road master. Most all cross-tie men also contract for bridge timbers and trestling, as well as telegraph poles. For the latter chestnut and cedar are mostly used. They bring about $1.75 apiece, and are cut mostly in the tamarac swamps of Michigan and the forests of southern Kentucky and Tennessee. Large sums of money have been made by lucky contractors above described, and each only adds to increased demands. Ohio has over 4,000,000 acres wood land, yet the ever increasing demand for railroad purposes alone, if supplied entirely from our forests, would leave us without a single stick to mark the existence of our once dense forests.—*Cin. Commercial.*

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Cast-Iron Car Wheels in Europe.

Cast-iron car wheels, as is generally known, are little used in Europe, and are generally regarded there as very dangerous, and especially unfit for use under passenger cars. We might suppose this opinion to be founded on ignorance, were it not that some cast-iron wheels have been used for many years, especially in Austria, there being some Hungarian iron-works famous for the "chilling" property of their iron. But, as in spite of this long experience the opinion prevails there that cast-iron wheels are not only inferior, but positively unsafe, so much so that we believe many companies will not permit cars with cast-iron wheels to pass over their roads, though loaded with freight for stations on or beyond their lines, it has naturally been supposed in this country that the European chilling iron must be greatly inferior to ours. But it now seems questionable whether the cast-iron car wheels in Europe are not quite good and safe. An Austrian engineer' Mr. Emil Stötzer, foreman of the shops of the Empress Elizabeth Railroad at Linz, calls attention to the fact that during the past winter, which in Europe was an exceptionably severe one, while the cases of *tire* breakages amounted to thousands, and not a few accidents were due to this cause, so far as is known there was *not a single case* of the breakage of a cast-iron wheel, at least not one which interrupted traffic. In view of this he suggests that the prevailing prejudice against cast-iron wheels should be abated and that a great deal might be gained if at least all the freight cars that have no brakes should be provided with cast-iron wheels, but thinks that experiments should be made with cast-iron wheels under brakes also. He mentions the use of cast-iron wheels under passenger cars in this country, but seems not to understand how general this use is, and that of the 496,718 cars reported by Poor's Manual as the stock possessed by our railroads in 1879, probably 495,000 have cast-iron wheels.—*Railroad Gazette.*

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THE Mt. Clare shops of the Baltimore & Ohio road, in Baltimore, are building 50 refrigerator cars.

THE Baldwin Locomotive Works in Philadelphia have this month shipped 12 locomotives and several street motors to Australia.

THE Lehigh Car & Manufacturing Co., at Stemton, Pa., has taken an order for 300 box cars and 200 gondolas for the Missouri Pacific

Communications.

Some Minor Defects in Passenger-Car Construction.

To the Editor of the National Car-Builder:

Talking a short time since with an acquaintance whom I met on the road, and who I knew to be a great traveller, I naturally asked him what he thought of the cars on our line. "Well," said he, "they are very good, but the trouble with all you railroad fellows is that you set out to build a car, and you build a good one as far as you go, but you never quite finish it." This puzzled me at first, but a little further talk showed what he meant, and was indeed only a confirmation of what I had been thinking myself for some time. Since then, I have talked with others as I had a chance, and it seems to me that some of the ideas I have picked up may be of interest to your readers.

The leading impression derived from these conversations is, that while our cars have many excellent points, they do not provide for the comfort of travelers as fully as they should, simply because they are lacking in some apparently trivial things, which most of us builders are apt to overlook. But all human experience shows that comfort in this life is largely dependent upon little things, and a railway car is no exception to the rule. Now, much of this neglect of small things originates in a natural dislike to make changes and a tendency to look upon the established order of things as the best. Some of it is due to the fact that most car-builders stay at home too much, and even when they do travel they come very little in contact with the masses of people who use our passenger cars. Again, many of these people grumble to themselves or to their companions, but it is very seldom that such complaints reach the ears of those who ought to hear, and so we go on in the old way, not knowing that we are making mistakes both of omission and commission. Some of our craft, perhaps, may not want to know, but it is to be hoped that these are few in number.

And now, as to particulars. The most prominent of these complaints is in reference to the form of car seats. Much pains have been taken to make seats comfortable to the sitter. The springs, the frames, and many other points, have been carefully considered and improved; but in how many cars do we find the seats as well adapted to the human anatomy in all respects as they might be? Not many, we venture to say; and this for the reason that the seat-maker has forgotten that the particular part of the aforesaid anatomy which comes in contact with the cushion is convex and not concave, and that the cushion should be shaped in conformity therewith. On many roads the seats are convex also, and do not yield enough to adapt themselves to the shape of the sitter, thus reducing the point of contact to a minimum. Instead of comfortable rest, the passenger feels all the while as if he was sliding off, and this uneasiness mars much of the pleasure he would otherwise derive from his journey. Here and there we find a really comfortable seat; but in too many cases they are not only defective in the the manner alluded to, but the form of the back also does not fit the contour of the spine.

While on this matter of seats, I may mention that I have found a great many people—so many indeed as to form a larger proportion of my traveling acquaintance than I had thought possible—who complain of the almost universal use of *red* in upholstering seats. Now, it is well known that the reason for using this color is because it wears so well, and does not look shabby from long usage. Nevertheless, it is unpleasant to many people even though they cannot tell why. In summer the reason is quite obvious. Red is a color which more than any other is suggestive of warmth, and for this reason a glare of red cushions and seat-backs may be agreeable when the temperature is at zero, but it is just the reverse when the mercury gets to ninety or thereabouts. Why red should be disliked in winter is not so clear. One reason may be that most people have an instinctive preference for subdued colors in cars. The eyes are apt to be fatigued in looking out of the windows in a clear, bright day or when snow is on the ground, and it is certainly a relief to turn to the inside of a car in which the prevailing tints are neutral. This is the best reason I can give, and I believe it is at least one of the true ones. There may be others, but I am as certain as any one with ordinary experience can be that the aversion to red is very common, and that if any other color more acceptable can be substituted for it without too great a sacrifice, it should be done.

Another minor matter with regard to seats are the odd or corner seats in cars. These, as a rule, are about as uncomfortable as they well can be. For a short distance they are endurable, but for a long ride they are exceedingly tiresome. They are usually too long for one and too short for two, unless the other half is occupied by a pretty girl. By all means let the corner seats be full size or else only large enough for one, and let them have higher backs to shield the sitter's bones, if he happens to be lean, from the hard moldings and projecting wood-work.

I think that most passenger cars are not well enough lighted at night. Gas is used on some roads, and I believe it gives satisfaction if the supply is not too stinted. Where gas is not available, there are many excellent styles of lamps; but the trouble is there are not enough of them to a car. Good lamps can be had at moderate cost, and we certainly might use the good ones, and plenty of them. There are a great many of the ordinary class of cars running that have only two or three single lamps in them, that give just light enough to exasperate nervous and irritable people and disgust those of more quiet temperaments, when a half dozen lamps, at the most, would make things pleasant and cheerful. A man does not want to read fine print at night in a moving car if he has any care for his eyes, but he does want to look at his watch, jot down a memorandum, or take a glance at an evening paper, and this he cannot easily do in many of the ordinary coaches that run on our roads.

There are a few other things on my list of grievances, but as this communication is already pretty long, I will break off just here and sign myself

M. C. B.

* * *

The Valuation of Freight Box Cars.

ST. THOMAS, Ont., August, 1880.

To the Editor of the National Car-Builder:

It may be interesting to some of your readers to see, in tabulated form, the working out of Rule No. 17, of the Master Car-Builders' Rules, as referring to the valuation of box cars when destroyed on foreign roads, which may elect to pay for them on the basis of the rule, instead of rebuilding them.

The rule decrees that the company destroying the car shall have its option whether to rebuild it or pay for the same at the established price. If it elects to pay for it, a deduction shall be made by the owner for the depreciation of the car, truck or body, at the rate of 6 per cent. per annum, upon the depreciated value of the parts destroyed since last built. Provided, however, that such allowance shall in no case exceed 60 per cent. of the established price, which, for the current year, is $450 for an ordinary new box, or stock car. By taking this valuation, and deducting six per cent., or six one-hundredths, from its annually depreciated value, we find that it will require the car to be 14 years and 297 days old, before reaching the maximum deduction of 60 per cent. allowed, as at the end of that period the old car is assumed to be worth, at least, the remaining 40 per cent., viz., $180, on the basis of scrap material.

The following table gives the current value of a box car, according to its age, at the end of each consecutive year; also, each annual amount due to depreciation, until, in the aggregate, the maximum sum of 60 per cent., or $270, has been deducted. This occurs when, as before stated, the age of the car is 14 years and 297 days.

Age.	Value.	Annual depreciation.
New…………………	$450.00	……
End of 1st year…….	423.00	$27.00
“ 2d “ ……	397.62	25.38
“ 3d “ ……	373.77	23.85
“ 4th “ ……	351.34	22.43
“ 5th “ ……	330.26	21.08
“ 6th “ ……	310.45	19.81
“ 7th “ ……	291.82	18.63
“ 8th “ ……	274.31	17.51
“ 9th “ ……	257.86	16.45
“ 10th “ ……	242.39	15.47
“ 11th “ ……	227.85	14.54
“ 12th “ ……	214.18	13.67
“ 13th “ ……	201.32	12.85
“ 14th “ ……	189.25	12.08
“ 14th “ *…..	180.00	9.25
		$270.00 = 60 per cent.

JOHN ORTTON.

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* And 297 days.

* * *

Train Friction—How it may be Reduced.

To the Editor of the National Car-Builder:

When a railway train is moving either upon a straight track or around curves, it is of course impossible to keep the flanges of the wheels from touching the rails more or less, and the amount of friction caused thereby is very great. It is well known to engineers that during a fog or light misty rain, the driving wheels of engines are very apt to slip; and it is also admitted on the other hand that during a heavy rain an engine will do better work than it will during a light or misty rain, or when the track is dry, and can be run with more safety and at a higher rate of speed, especially upon curves. The reason for this would seem to be, that while a light rain wets the track just enough to make it slippery, a hard rain washes it clean of dirt and grease and allows the engine tires to keep in closer contact with the top of the rails, thus increasing the traction, while the water at the same time lubricates all the wheel flanges as well as the inside of rails and prevents a tendency to climb.

If a rain storm produces these advantageous results, why not, by using a small supply of water with pressure from the tank, wash the rails clean at all times in dry weather? To do this, I would suggest a half-inch pipe, connected back of feed-pipe plug, or to the tank direct. In the latter case, a rubber pipe would be necessary between engine and tender, and in it a small cock with a rod attached passing up through running-boards, the pipes to be continued along the frame of engine to within about 30 inches of the pony truck, where they should be connected with a rubber hose leading to rear of truck. This will allow for the truck swing. From the hose, additional piping secured to top part of truck passes over to the front and terminates on each side in a rose-jet nozzle 2 inches in diameter and about 4 inches above the rails—the nozzles having very fine holes. Two rear sprinklers back of drivers would also be of service to wash sand from the track, when it is used, instead of running over it. The water would thus strike the rails hard from the force of compression, and be equivalent to a hard rain instead of a light one.

On all curves, the outside wheels tend to bind or climb the rail, while the inside ones, having a a shorter distance to travel, slip back and allow those on the long rail to free themselves. By washing the rails, the slipping back of the inner wheels is done with much less friction, the tendency of the outer ones to climb the rail is greatly lessened, and the grinding noise which is always heard on roads with sharp curvatures, is entirely done away with. At crossings on heavy grades, where the dust accumulates, the forward sprinklers should be shut off and the rear ones opened, so as to give the train wheels the benefit of the water, and render the engine less likely to slip. In cases also where engines run to one side more than to the other, by using the water ahead of the truck wheels on one side, and back of them and ahead of the driving wheels on the other, the running can be regulated so as to be more uniform, and the wheels that have begun to cut on one side can be relieved. Among other advantages it may be noted that brake-shoes and wheels could be kept cooler, the retarding pressure increased, and the fine dust along the track prevented to some extent.

I would add that the beneficial results of an artificial application of water to railway tracks, as proposed, are not merely theoretical. It has been prettly clearly demonstrated in practice, that with an average train the difference between running on dry rails and rails well washed, is about equal to the hauling of one car; that is, the engine will get over a washed track as fast with the whole train as it can over a dry one with one car detached.
INQUIRER.

The Importance of Round Car Wheels.

To the Editor of the National Car-Builder:

I notice in your last issue an elaborate article from the *Railroad Gazette* pointing out sundry existing defects in the construction of car trucks. That there are such defects will be readily admitted by most railroad men. Without attempting to suggest a remedy for all the imperfections referred to, I desire to call attention to the fact that a successful process has already been devised for giving to chilled iron wheels a perfectly true periphery, and so complete is the process, that after a wheel has been turned off, a piece of thin paper may be placed between the face of the wheel and the cutter, and the paper will be cut all the way round while the cutter will not touch the wheel.

The rapidity of the process depends somewhat, of course, upon the condition of the wheels. If not in very bad condition, one pair of 33-inch wheels can be trued in an hour. Cast wheels, as they come from the foundry, are none of them perfectly true; and it is also a fact that a large proportion of all wheels held and centered for boring by the ordinary 3-dog chuck, will, when pressed on the axles, run out of true just three times as much as the wheels are oval or deviate from a true circumference. This is a point that has been very generally overlooked. Because the chuck is a "universal" one, it is naturally supposed that the boring of the wheel is a true bore, or no more out of true than the wheel is oval. This, however, is a great mistake, as the long point goes in between two of the dogs every time, and the other dog on the other point. I have trued great numbers of chilled wheels when one would be out of true $\frac{3}{16}$ of an inch, while its mate on the same axle, and bored in the same chuck, would be only $\frac{1}{16}$ out of true. Sometimes wheels are pressed on with their ovals at right angles, and sometimes on a line with each other. In the former case the car will have a rolling motion, and in the latter it will have a bouncing up and down movement. If the brakes are applied with a severe pressure upon wheels with an eccentricity of $\frac{3}{16}$ of an inch, the wheels are almost sure to slide, whether they are running slowly down heavy grades or rapidly on level track.

The method referred to for remedying this prime defect in the working of car trucks, is the Gowan machine for grinding the chilled tread of wheels. Its weight is about 4,000 pounds; the sole plate is 12 ft. × 5 ft. 9 in. It will take from 24 to 42 inch wheels, and axles of various lengths. As to the results of this method, it may be stated that 16 pairs of 33-inch wheels trued by this process, were put under passenger cars of the Virginia & Truckee Railroad, Oct. 1, 1877, and have made over 122,000 miles to this date, and are still in good condition. In reference to steel-tired wheels, it may be said that while they can be made true at the start, and will run well so long as they remain true, it often happens that one of them is softer than the other on the same axle, and this causes the same trouble that arises in the case of chilled iron wheels.

CHICAGO, August, 1880. B. W.

Continuous Brakes in England.

The adoption of an effective continuous brake appliance for passenger trains on the English railways, appears to be attended with great difficulty. The vexed question has been agitated for years, and the public interest in its solution intensified by the occurrence of a series of accidents attended with the loss of many lives, the most noted of which was the one at Shipton in 1874. Some three years ago the Board of Trade addressed a circular to all the railway companies specifying certain conditions which in their opinion were essential to a good continuous brake. These conditions were substantially as follows:

The brake must be efficient, instantaneous, and capable of ready application by both driver and guards; in case of accident, to be instantaneously self-acting; to be readily put on and taken off from every vehicle in the train; to be readily used in daily working; and to be of durable material and easily kept in order.

Very little attention was paid to this by the companies; and an act was subsequently passed, requiring them to make returns every six months of the number and description of brakes on their respective lines, so as to show how far the conditions named had been complied with. Four half-yearly returns since made, show that of the 78 railway companies in Great Britain and Ireland, only six use brakes that comply with the conditions to any appreciable extent; eight companies have a few engines and carriages so fitted; and the remaining 64 companies have none of their stock so equipped. The aim of the government appears to be to secure the adoption of a uniform brake system on all the lines, by getting the companies to agree as nearly as possible as to which one (or two) of the many styles of brakes now in use is (or are) the best, and compel the adoption of one, or at the most, two particular types. The companies, however, show no disposition to co-operate with the government in bringing about the desired uniformity, but each adheres with characteristic tenacity to its own particular practice, assuming that their own officers, who have great experience in railway service, know a great deal more about such things than the officers of the Board of Trade. Mild and conciliatory circulars and recommendations having proved of little avail, the Board has recently issued a new circular of a different tone, intimating that unless the companies undertake to equip their passenger trains within a certain period to be named by them (the companies), with brakes in conformity with the requirements above named, the government will try compulsory means. But whether such a measure can be carried in opposition to the united power of the companies, remains to be seen.

The trouble is in deciding what style or styles of brake to adopt. The different kinds already in use are so numerous, and the partisans of each are so influential, that no choice that could possibly be made would be generally satisfactory either to the railway companies or the public, nor is there any likelihood that the brake so chosen would be the best that is attainable. Aside from the requirements set forth in the circular of the Board of Trade, Capt. Douglas Galton, who is a high authority in the matter of train brakes, summarizes in his final report on the subject the following additional requisites as being indispensable to a perfect brake, namely:

The maximum brake pressure on each pair of wheels should be about twice the load on such wheels; it should be so regulated that the friction between the blocks and the wheels should never exceed that between the wheels and the rails; each vehicle should have its own independent store of brake power; and the brake pressure should be easily graduated at will, to suit the speed of the train, the descent of long inclines and other varying circumstances of railway working.

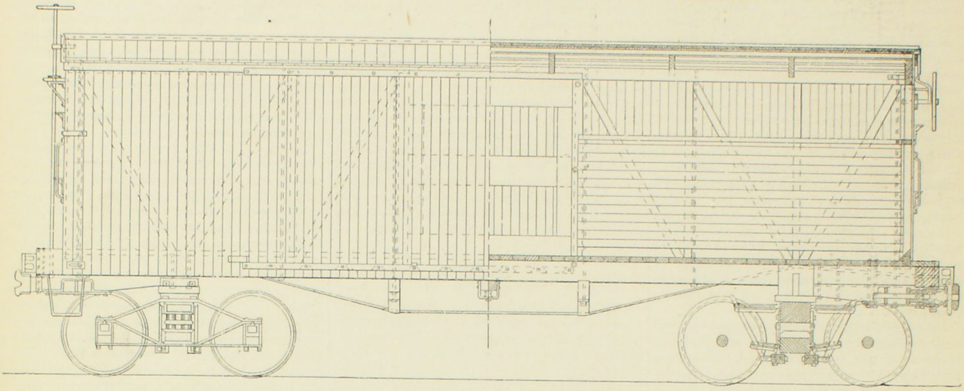
It is an easy thing to frame conditions and requirements, and there seems to be hardly any limit to these, theoretically, in the matter of train brakes for freight and passenger service. But practically there is and must be a limit, and until this is clearly defined and recognized by inventors, railway men and the public, this whole subject will be involved in more or less confusion and uncertainty. One of the above-named conditions requires that a brake must be "self-acting in case of accident," which means doubtless that it must act on each and all the cars in case a coupling breaks, or when from any cause the train becomes divided; or, in other words, it must act at all times, and be always in order when it is out of order, so to speak. It is manifest that whatever uniform brake system is adopted by the roads, or is forced upon them by legal requirement, either in England or in this country, will fall somewhat short of perfection, and thus leave a margin for further improvement; and it is equally manifest that no uniform brake appliance will ever be concurrently adopted and put in use upon a great number of roads, each one of which is free to act independently in making a choice. Or, if such concurrent action is possible it must be the result of compromise, and this is the point at which the brake struggle in England has arrived.

A Queer Locomotive.

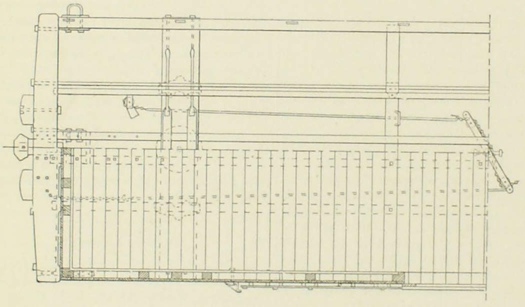
The Paterson (N. J.) *Guardian* says that an engine is now in process of construction at the Grant Locomotive Works which, it is thought, will eclipse for speed anything yet built. It will look like an ordinary engine turned upside down. The machinery will be on top of the boiler instead of under it, as usual, and the boiler will hang very low on the wheels. There will be two pairs of driving-wheels, but instead of having them follow each other, one pair will be on top of the other. The real driving-wheels will be the upper pair, and they will turn in the opposite direction from that in which the engine is going. They will rest upon the rims of the other pair, which will in turn rest on the track. The revolution of the upper pair, by friction, is expected to drive the lower pair, the tires of the latter serving as tracks for the upper ones. It is thought that a good deal greater speed can be got out of the machinery by this construction, and it is expected by the inventor that it will be the fastest locomotive ever made. Practical workmen, however, think it won't go at all. It will look very funny, as it is running through the country, with the upper pair of driving-wheels, five feet in diameter, revolving up in the air in the wrong direction at a tremendous speed, and the eccentrics, rocking-bars, link-motion and pistons on the top of the boiler.

THE Chicago & Eastern Illinois shops are building a lot of coal cars to carry 16 tons each.

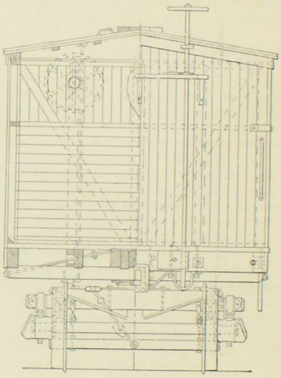
STANDARD FREIGHT BOX CAR OF THE PENNSYLVANIA COMPANY.



Side Elevation and Section.



Half Plan.



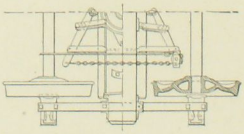
End Elevation and Section.

GENERAL DIMENSIONS.

Total length of frame	29 ft.	10¾ in.
Total length of body	28	0
Total width of body	8	7¾
Length of running board	28	4½
Width of running board	—	18
Width of door opening	5	4
Width of door	5	6

BODY TIMBERS.

Side sills	4¼x 8½ in.	x 28 ft.	9 in.	Yel. pine.
End sills	8½x 9¼	x 8	10	Wh. oak.
Center stringers	3¼x 8	x 28	9	Yel. pine.
Intermediate stringers	3¼x 8	x 28	9	“
Cross bearers	4¾x 7½	x 8	8	“
Bolsters	5½x14½	x 8	8	Wh. oak.
Draught timbers	3¼x 7	x 4	4	“
Block for center lever	4¼x 7¾	x 1	1	“
Blocks over center plates	7¼x 6¾	x 1	3	“
Blocks for saddles	4¼x 7¼	x 1	3	“
Pieces for foot of end posts	2¾x 3¼	x 8	2	Yel. pine.
Corner posts	3¾x 4¾	x 6	5	“
Door posts	3¾x 4¾	x 6	5	“
Intermediate side posts	3¾x 2¾	x 6	5	“
Intermediate end posts	2¾x 3¾	x 6	3	“
Center end posts	2¾x 4¾	x 6	3	“
Side braces	3¾x 2¾	x 7	long.	“
End braces	2¾x 3¾	x 7	2 in.	“
Side plates	3¾x 5½	x 28	3	“
End plates	2¾x13½	x 8	8	“
Carlins	2¼x11	x 8	8	“
Center purlin	2¼x 4¼	x 28	3	“
Intermediate purlin	2 x 3¼	x 28	3	“
Door strip (stops)	2 x 3¼	x 6	6	“
Step for end brake	1½x 8¼	x 2	6	Wh. oak.
Fascia boards (side)	1 x 4	x 28	6	Wh. pine.
Fascia boards (ends)	1 x 4	x 4	9	“
Running boards	1½x 6¼	x 28	6	“
“ “	2½x 6¼	x 28	6	“
Guide Rail (top)	2¾x 3½	x 11	5	Yel. pine.
Guide rail (bottom blocks)	1 x 2	x 10	long.	“
Cappings for sides	1¾x 3¾	x 11	1 in.	“
Cappings for ends	1¾x 3¾	x 8	8	“
Siding	1 x 4½	x 7	2	Wh. pine.
Platform planks	2 x11¼	x 9	long.	Yel. pine.
Door stiles	1 x 6¼	x 4	4 in.	Wh. pine.
Top rails for doors	1 x12	x 5	8	“
Bottom rails for doors	1 x12	x 5	8	“
Middle rails for doors	1 x12	x 5	8	“
Siding for doors	1 x 4½	x 6	3	“
Inside lining for sides	1 x 4½	x 11	1	“
Inside lining for ends	1 x 4½	x 8	2	“
Cant boards for sides	2¾x 2¾	x 11	1	“
Cant boards for ends	2¾x 2¾	x 8	2	“
Roofing (well seasoned)	1 x 5¼	x 4	9	“
Flooring (planed side up)	2 in. thick	x 8 ft.	8 in. long.	Yel. pine
Pieces for covering nuts	1¾ x 2¾ in.	x 12 ft.	long.	Wh. pine.



Half Plan of Truck.

TIMBER IN TRUCKS.

Top bolsters	8¼x12½ in.	x 7 ft.	5 in.	Wh. oak.
Bottom bolsters	6¼x12½	x 7	5	“
Brake bars	4 x 6½	x 5	10	“
Truss blocks	3 x 6½	x 1	3½	“

The axles have 3½ x 7 inch journals and 4¾ inch wheel seats. Maximum carrying capacity of car, 40,000 pounds.

New Passenger Cars for the New York Central & Hudson River.

An important addition of 21 new coaches, 3 smoking, and 4 combination cars, has just been made to the passenger equipment of this road. The most of them were built at the West Albany shops, and the residue at Central Morrisania. They are 54 feet long, exclusive of platforms, and 9 feet wide over all. In their interior finish and fitting up they are in some respects such a marked departure from the prevailing style, as to merit a somewhat detailed description. The most noticeable feature is the arrangement of the seats, which is similar to that of the cars of the Metropolitan Elevated Railroad. Some have 10 and some 18 cross-seats in the central part of the car, while the other seats run along the sides. The former have Buntin frames. All the seats and backs are covered with Hale & Kilburn's rattan-canvas seating which is cleaner and more durable than leather or plush, and sufficiently elastic to be comfortable to the sitter. Each car seats 64 persons. The sides and ends are finished in solid mahogany. The ceilings of the regular coaches are of decorated oak, but in the compartment cars canvas is used. What strikes one as the greatest improvement as compared with ordinary steam road cars, is the great quantity of window space and the abundance of light. There are 18 windows on a side, consisting of 2 central ones of 31 × 36 glass, and 16 others of 31 × 22, the thickness of the plate being $\frac{3}{16}$ inch. The sashes are single, and a cornice and spring curtain are attached to each. The curtain can only be pulled down to the bottom of the glass, and when the sash is raised the curtain goes with it and can not flap in the wind. The sash can be raised only about 9 inches, or just far enough for the lower part of the frame to be below the eyes of passengers and not obstruct the view. The spaces between the smaller windows are quite narrow, but between the large central ones (which are from 2 to 4 in number according to the number of cross-seats) are wider panels filled with 14 × 45 inch mirrors. The saloons have solid slate floors. The bell-cord runs along the side roof below the deck lights instead of in the center, and can be changed from one side to the other when necessary. Abundant provision is made for ventilation, Each alternate deck-light can be dropped; there are two Creamer ventilators at each end, and also a swing transom. The floors are laid with matting. The seat divisions and arm-rests are nickel-plated. With the exception of canvas head-linings, the combination cars are fitted up in the same way for passengers, about one quarter of their length being devoted to baggage. The four-wheel standard trucks of the road are used, also Westinghouse automatic brakes, and Miller platforms and couplers, with safety coupling-chains. In each car is a safety-cord running along the side and connected with the brake apparatus, so that the pulling of it applies the brakes. The outside of the cars is painted a light straw-color, and in a style corresponding with the other passenger car stock of the road.

These cars are mainly designed for local travel, the larger portion of them running from Buffalo to certain points on the New York Central division, and the rest between New York and sundry places along the Hudson River. Those in service have been put on the road within the past month. They are certainly delightful cars for summer travel, and when suitably warmed, will prove no less so in winter. In their special features they have been designed by Mr. L. Garey, the General Master Car-Builder of the road.

◆

The Italian government has approved a contract between the Pullman Car Company and the Campagnia Meridionale, the most important of the Peninsular railways, by which a regular sleeping car service will be established between Bologna and Brindisi, which forms a portion of the route to India. It is not too much to say, says the London *Telegraph*, that if European railway arrangements were as complete as they are in the United States, the same Pullman car entered by a traveler at Paris, ought to land him at Brindisi. In the old world, where distances are short and railway speeds more accelerated than in the States, it is but natural that the demand for sleeping cars should not be so general. The Italian section of the overland route to India is precisely the one in which the facilities offered by a Pullman Palace car can be most valuable and most appreciated; and the cars between Bologna and Brindisi will doubtless be extensively patronized.

◆

A new special car, built for the use of Hon. Thomas Allen, President of the St. Louis, Iron Mountain & Southern Railway, is thus described: The car is mounted on six-wheel trucks with paper wheels. The exterior of the car body is painted a rich maroon color, bordered with gold trimmings, quite plain, but rich in effect. The rear platform is inclosed with a railing, and doors close down over the steps. For the purpose of observation, on either side of the rear door the windows are cut down to the floor and hung on hinges, so that the entire end can be opened. Here we enter the parlor, a spacious room, carpeted as is the entire car, with a handsome Brussels, while the furniture is upholstered in elegant style with leather. The curtains are made of raw silk. In this spacious parlor is a large stationary table and a sumptuous sofa, which can be utilized for two sleeping berths. Further along in the center of the car are two staterooms with stationary bedsteads; between these rooms is a toilet-room and two commodious wardrobes; a secretary and bureau are also part of the furniture, while the chairs are upholstered in silk. Beyond these is the sleeping and dining room, constructed like the ordinary Pullman sleeper with four double berths. Tables can be placed in position as in a dining car when meal-time arrives. The remainder of the car is devoted to the kitchen, heater, cupboards, ice-box for provisions, toilet-room, etc. The interior of the entire car is handsomely inlaid with various woods in representation of flowers and vines, and the panels are of oak with the remaining portions of mahogany. The car is lighted with the Hicks & Smith lamps, and heated and ventilated by the Gouge system. Altogether, the car is one of the finest in the western country.

◆

An exchange states that a new style of passenger car has been designed for the Philadelphia & Reading road, and is now nearly finished. It has been called "a Swiss cottage on wheels." The dimensions are about the same as those of an ordinary first-class passenger car. There are no curved lines anywhere except some turned rosettes. In the building of the car and in the ornamentation, right angles were observed. The elevator rises square above the roof, but the rafters, all of which show, meet in the centre of the elevator roof. The rafters are of iron and wood, the former being exposed and painted so as to preserve the natural color of the iron, and the natural grain of the wood will also be shown. The interior portion of the car, excepting the iron, is all of oak, paneled, beaded, chamfered, and notched, and there is not a single piece of wood, if it is only a few inches long, that has no notches, grooves, right angles, or rosettes. The head lining will be frescoed. On the exterior of the car there are brackets above and below the windows to break the monotony of the weather-boarding, which also extends above and below the square windows, and there are rosettes on the panels between the windows. The outside will be painted olive green.

Locomotive Performance.

The following is a statement of the performances of locomotives on the Pittsburg, Fort Wayne & Chicago Railway and Branches, for the year 1879, the total length of the lines being 468 miles:

Number of miles run on passenger trains	1,123,193
" " freight "	3,704,009
" " shifting "	1,058,701
" " ballast "	135,795
Total number of miles run	6,021,698
Total passenger car mileage	5,362,912
" freight " "	59,975,700
Average number of cars hauled per mile on passenger trains	4.7
Average number of loaded cars hauled per mile on freight trains	16.1
Average cost of passenger cars per mile hauled	'2,265
Average cost of loaded freight cars per mile hauled	855
(Five empty freight cars estimated equal to three loaded cars.)	
Percentage of empty freight cars hauled	26

The average cost per mile for cars hauled includes all expenses of engines, both in and out of shop, but does not include the expense of shifting and ballast engines.

Number of miles run to one ton of coal	41.13
" " quart of lubricating oil	42.43
Cars hauled one mile per ton of coal, passenger	236.6
" " " freight	567.2

All oil used on engine and tender, except head light oil, is included in "Miles run to one quart of oil."

Cost per mile run for repairs		2.57
" " " fuel		3.69
" " " oil and waste		.36
" " " engineers, firemen and cleaners		6.08
All other motive power accounts including all repairs of shops, turn-tables, and expense of water supply, etc. ($91,019.11)		1.51
Total cost per mile run		14.21
Quarts of oil used		141,900
Pounds of waste used		73,062
Tons of coal	139,042¾	
Cords of wood (128 feet)	7,354	
Total equivalent tons of coal	146,396¾	

N. B.—Tons of coal and cords of wood are reckoned together as equal in computing miles run to one ton of coal.

J. D. Layng, General Manager.

The following is the statement of locomotive performance of the Missouri, Kansas & Texas Railway for the half-year ending June 30, 1880: Total number of miles operated, 795.

	Miles.	Cost per mile.
Freight train engines	1,046,185	17.38
Passenger "	421,851	13.08
Work "	107,227	13.58
Switch "	206,295	10.05
Total mileage	1,781,558	Average.. 15.29

Average miles run per ton of coal	38.77
" " quart lubricating oil	36.99
" " " all kinds "	24.09
" " pounds of waste	152.92

Cost per mile run:

	Repairs.	Wages.	Stores.	Fuel.	Total.
Freight train engines	3.95	6.72	0.44	6.27	17.38
Passenger "	3.52	5.78	0.42	3.36	13.08
Work "	4.07	6.33	0.26	2.92	13.58
Switch "	2.75	5.16	0.32	1.82	10.05
Total	3.72	6.29	0.41	4.87	15.29

Average cost per mile for water supply and fuel stations	0.65
Total cost per mile, all expenses included	15.94

Revenue train engines are allowed card miles only. Work train engines are allowed 8 miles per hour, when in use. Switch engines are allowed 6 miles per hour, when in use.

Loaded car statement:

	All engines.	Revenue engines.		
	Cost per car per mile.	Cost per car per mile.	Average cars hauled one mile per ton of fuel.	Average cars per train.
Freight	1.29	1.05	503	16.6
Passenger	3.12	2.67	280	4.9

Average number revenue engines for half year	70.67
" miles run by rev. engines	20,773
" work train engines	6
" switch engines	9.33

Car repairs per loaded car per mile:

Cost per loaded freight car	0.58
" passenger car, including Pullman	1.65
" Pullman car	0.48

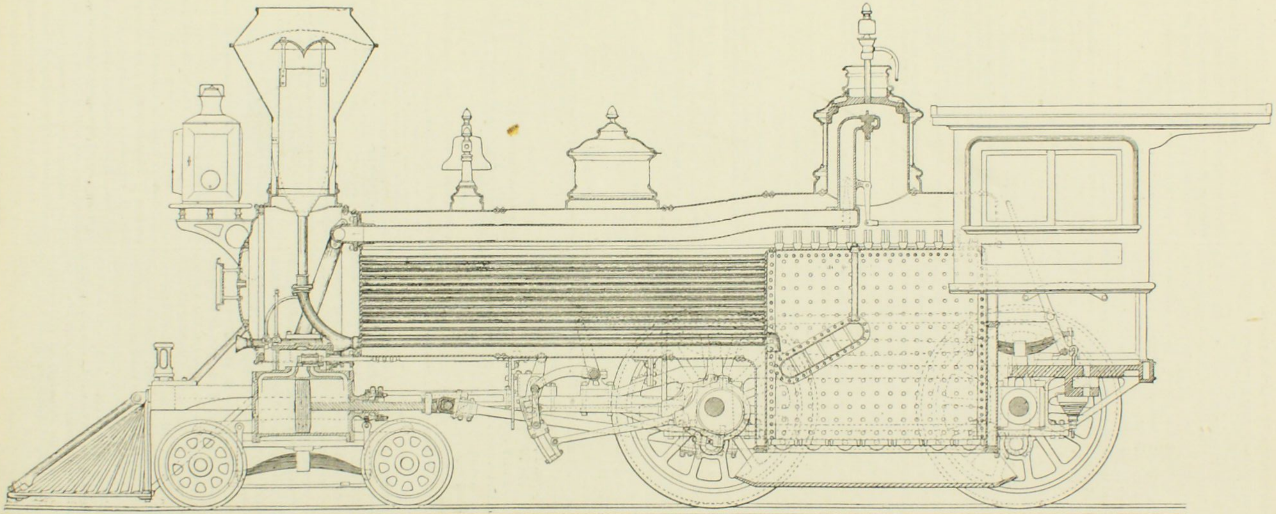
Total expense, machinery department per loaded car per mile:

Freight train service	1.78
Passenger train service	4.77

Geo. W. Cushing, Supt Mach'y.

◆

A company has been formed at Detroit for the purpose of manufacturing a car designed by Mr. Geo. S. Jacques, and intended for commercial travelers. It is a combined sleeper and hotel car with sample-car advantages, and will accommodate six persons, with their sample trunks and ordinary baggage, and will contain several spacious compartments for the display of their goods. The idea is to attach the car to regular trains and side-track it at such towns as the drummer may desire to do business in.



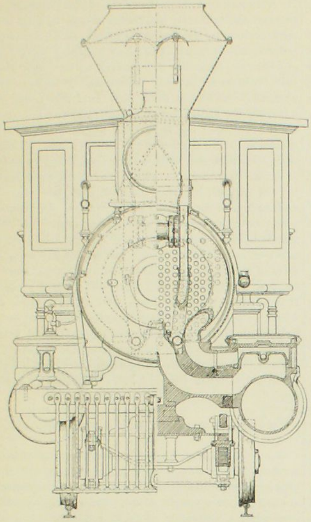
STANDARD LOCOMOTIVE FOR FREIGHT AND PASSENGER SERVICE—OLD COLONY RAILROAD MASS.

THE engraving shows in section the new standard locomotive for freight and passenger service recently built by the Old Colony Railroad Company. On the opposite page is shown end elevation and section of same. The illustrations, together with the dimensions given, will convey a very good idea of the construction and working parts. The engine is provided, as will be seen, with the Berney spark and smoke consumer, which has already been attached to several engines on the road, and is found to work well. Two of these standard engines have been built to take the place of two old ones that have become unfit for service, and two others are now in course of construction, one of which is to have 5 ft. 9 in. drivers. They are all built under the direction of Mr. J. K. Taylor, the Master Mechanic of the road.

DIMENSIONS.

Diameter of boiler	50 in.
Thickness of plate (steel)	⅝ "
Number of tubes	192
Length of tubes	11 ft. 4 in.
Outside diameter of tubes	2 "
Length of fire-box, inside	72 "
Width of fire-box, do	35 "
Depth of fire-box, do	68 "
Square feet of grate surface	17½
Square feet heating surface in fire-box	110½
Square feet heating surface in tubes	1,138
Total heating surface	1,248½
Diameter of cylinders	18 in.
Stroke of piston	24 "
Length of steam-ports	15 "
Width of steam-ports	1⅛ "
Width of exhaust-ports	2¾ "
Travel of valve	5¼ "
Outside lap of valve	⅞ "
Inside lap of valve	1/32 "
Diameter of piston-rod	2⅞ "
Diameter of driving-wheels	5 ft.
Diameter of truck-wheels	28 in.
Center to center of driving-wheels	8 ft. 4 "
Wheel base of engine	22 " 5 "
Wheel base of engine and tender	42 " 0 "
Diameter of driving-axle journals	7 "
Length of driving-axle journals	8 "
Length of main crank-pin journals	5 "
Diameter of main crank-pin journals	4 "
Diameter of parallel rod journals	3 "
Length of parallel rod journals	3 "
Weight on driving-wheels	49,500 lbs.
Weight on truck-wheels	26,500 "
Total weight of engine	76,000 "
Weight of tender, empty	24,000 "
Weight of tender in working order	51,000 "
Capacity of tank	3,000 gall.

The engine has water-table and circulating-tubes in fire-box; is equipped with the Westinghouse automatic brake, has two Hancock inspirators, and United States metallic packing in piston.



Master Car Painters' Association.

The eleventh annual meeting of this association will be held at the Laclede Hotel in St. Louis, Mo., on Wednesday, Sept. 15. Master car and locomotive painters, and also foremen painters in charge of division road shops, are earnestly invited to be present and take part in the proceedings. The following subjects will be introduced in their order for discussion:

1. Which is the most durable and the least expense to maintain, light or dark colors on car bodies?
2. Which makes the best foundation for a dark-colored car-body, iron or lead paint?
3. What makes the best finish for passenger car floors?
4. What is the most durable and economical for blacking locomotive stacks and fire-boxes?
5. Which is the most durable finish for inside coach work, a gloss finish or rubbed and oiled?
6. Should wood or veneered head linings be oiled, or left flat after rubbing?
7. What is the best method of mixing putty for passenger car work, speed and durability combined?
8. The best way of preparing a locomotive tank that is rusty, for painting, after the old paint is scraped off.
9. Will varnish wear as well on a color composed largely of burnt umber as it will on a similar shade of color where umber is not used?
10. Is it necessary to paint the back of car panels and sheathing?
11. What is the best method of painting locomotive tanks, both outside and inside, and also the water space, to prevent rusting?
12. Which is the most durable and best adapted to railway buildings, iron or lead paint?

Mr. Benjamin J. Gregg, Master Mechanic of the Cincinnati, Sandusky & Cleveland road, died July 31, at his home in Sandusky, O., of congestion of the lungs.

The Bass Foundry & Machine Works, at Ft. Wayne, Ind., now employ over 600 men, and are full of orders for wheels and other railroad castings. The Chicago branch is also very busy.

A Well-Earned Compliment.

The London *Telegrah* pays the following tribute to the efficiency and faithfulness of railwaymen:

"Most passengers are as ignorant, happily, of the pitfalls under their feet as of the intricate process of digestion or the anatomy of the human frame. They take their journeys as they do their food, trusting blindly that somehow or other it will be all right and that the narrow corners will be shaved, and it seldom occurs to them to express their thankfulness for the manly devotion which contributes to their safety. While faith is the guiding rule of the traveler, duty is the absorbing principle of the railway servant. But does it never occur to the wakeful traveler as the lamps flash past him, as the train rushes over bridges and through a network of signals, as the tunnel seems a dull roar and the lighted station a suppressed scream, when the pulse of the motion never stops and the impetus at times becomes almost terrible, what a sense of gratitude there ought to be toward those lonely men who, faithful to the end, turn this point at that, shift the lamps, keep watch and ward, and clear the way for the swift express! Those who have trusted themselves to this splendid power are utterly powerless. Their lives are in the hands of the men who drive the train, and the signalmen who watch. Yet there is no sleep in the signal-box or at the tunnel mouth; there is no conversation, no distraction, nothing but a dull monotony of duty. A score of things may have happened; the staff may be short-handed, some one is unexpectedly on the sick list, some good-natured fellow may have done double duty out of pure comradship; but this makes no difference in the safety of the line. There need be no cause for fear when such men know their duty and do it."

A Lesson for Brakemen.

A railroad brakeman who had been celebrating his grandfather's birthday, was arraigned before a Detroit Police Court. "You run on the cars, eh?" asked the court. "Yes, sir." "And you belong to that class of men who open the door as the train stops at Pontiac, and yell out 'Upontyack' at the passengers?" The man was silent. "It makes my bones boil to think how I've been used on these railroads," continued His Honor. "The seats are locked, the water-cooler empty, the windows won't stay up, and every few minutes you open the door and cry out 'Jawkun' for Jackson, or 'Kalazoo' for Kalamazoo. I believe I'll mark you for six months." "Please sir —" protested the prisoner. "I must strike a blow at this great evil somewhere, and I might as well begin with you." "Please sir, I was never here before, and it's my first drunk in four years." His Honor leaned back and chewed the corner of a blotting-pad while he reflected. Finally he said: "Well, I'll let you go, though I'll be blamed for it. Now, sir, after this you want to adopt a different style. When the train approaches a station, you want to go through the car like a cat, smile gently, and say in quiet tones, 'Ladies and gentlemen, this train is now in the outskirts of the beautiful City of Ypsilanti, and such of you as desire to stop off will please make ready; and may health and prosperity ever attend you.' What an innovation that would be, sir! How the traveling public would rush for your road! Will you do this, Mr. Wellington?" The prisoner promised, and was allowed to go.

Rawhide is said to make good journal-boxes for machinery. A practical machinist says: "I have run a piece of machinery in rawhide boxes for fourteen years without oil; it is good yet, and runs at 4,500 revolutions per minute. I put it in, while soft, and let it remain until dry."

The Ohio Falls Car Company has just completed four day passenger coaches for the Louisville, New Albany & Chicago road. A reporter for the Louisisville *Courier Journal* was invited to look at them, and gives his impressions in the following gushing style:

"The names of the cars will be Indiana, Kentucky, Michigan and Illinois—in honor of the four states through which this road extends. Mr. Hayden is the architect of the cars, and the pattern is new and novel. The windows are twice as large as those of ordinary passenger coaches, and both the interior and exterior finish of the latest style. The wood-work finish on the interior is of walnut and oak, the ceilings being beautifully traced in gold and colors. The wood-work is done under the superintendence of Mr. Ramsey, one of the best master car-builders in the country. The painting is the finest that an artist can conceive, and Mr. S. B. Leach, the superintendent of the painting department, is certainly a recognized artist. The Eastlake style of painting is used, and the ornamentations on the outside of the cars is the finest that skill could make it, and the workmen of the Ohio Falls Car Company feel proud of their job. The Louisville, New Albany & Chicago Railway deserve great credit for furnishing the money to bring out such elegant cars, and we know when they are put on the line their patrons will appreciate them."

We would like very much to publish a description of these beautiful cars, but as we cannot inspect them ourselves, nor get any one to send us a description, we print the above, although the writer is evidently not a master in this line of literary effort.

Fast Time.—The Ft. Wayne (Ind.) *News* of Aug. 5 says: "Train No. 5 on the Pittsburgh (Ft. Wayne & Chicago) is generally pretty fast, but this morning she left here a little late, and between Plymouth and Valparaiso Dave King, with the 161, thought he'd make up a little time. The distance is 65 miles, and the run was made, with four cars, in 79 minutes, including a stop for water and one for a crossing, occupying eight minutes." The engine in this case had 5-ft. driving wheels. The same paper of Aug. 7 tells the following, the train in this case consisting of a baggage car, two passenger cars and a sleeping coach, drawn by engine No. 221: "No. 5 on the Pittsburgh yesterday morning made the fastest time on record, between Crestline and Fort Wayne. The distance is 131 miles, which was made in two hours and 45 minutes, making six stops. Allowing a trifle over three minutes lost by each stop (including water stops), the actual running time was 131 miles in 120 minutes."

A good deal of the boorishness and thoughtless selfishness that exhibit themselves on railway trains might be cured if there were a more general quiet and firm assertion of personal rights on the part of passengers. The large class of people who generally surrender their rights rather than "have a row" over them has much to answer for in the encouragement of bad manners on railroad trains. Bad-mannered people become and continue so, to a large extent, because they get no lessons in good manners. The "rules of the road" are generally simple and easily understood. The infractions of them are generally such that there cannot be much room for dispute over them, and a quiet assertion of the rights is sure to succeed. For their own sakes, and for the sake of the public generally, travelers who are annoyed or imposed upon by bad railway manners of any kind should claim their rights, even at the expense of a little temporary unpleasantness. A well-taught lesson, whether to a passenger or an official, is never thrown away.—*Exchange.*

The Pullman Car Shops in Detroit have just turned out two very handsome sleeping cars to run between Boston and Montreal by the Boston, Concord & Montreal and Passumpsic lines.

NATIONAL CAR BUILDER

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Advertisements.—*Nothing will be inserted in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *The editorial department will contain our own views and opinions; and the rest of the reading matter, aside from advertisements, will be such as we consider of interest to our readers.*

Contributions.—*Articles relating to railway rolling stock construction and management, and kindred topics, by those who are practically acquainted with these subjects, are especially desired. Also early notice of changes in railroad officers, organizations and names of companies.*

Special Notice.—*As the* CAR-BUILDER *is printed and ready for mailing on the last day of the month, advertisements, correspondence, etc., intended for insertion, must be received not later than the 25th day of the month.*

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WHY DOES NOT RAILROAD PASSENGER TRAFFIC INCREASE?

It is a well-known fact, as shown by the reports from year to year, that the aggregate of passenger traffic on all the roads of the country does not increase. For the past ten years the total passenger mileage has remained about stationary. While some of the roads in newly settled regions, or such as have largely increased their mileage, have shown an increase, the older roads, and notably the great trunk lines, have barely held their own. The freight tonnage has at the same time increased enormously, and for this there is a sufficient reason in the great increase of products to be transported, and an ever widening area for their distribution. The innumerable things which form the bulk of railroad freight can also be classified in all sorts of ways, and every kind of discrimination made as to rates to suit the needs of shippers and the state of the markets. It is but natural, then, that this class of traffic should develop in about the ratio of production. On the other hand, it would seem fair to conclude that passenger traffic should grow with the increase of population. The two kinds of traffic are of course radically different. One deals with things and the other with persons, and these are so unlike that it is impossible to place them on a common ground for purposes of railroad transportation. Still, it may be asked, if the one kind of business responds to the increase of products, why should not the other respond to the increase of population? Has the development of passenger travel reached its limit, or is its stationary condition owing to the want of a more judicious management?

The problem is a very complicated one and difficult to solve. It seems to be next to impracticable to devise any system by which the principles which govern freight transportation can be applied to passenger traffic. The one admits of almost any amount of flexibility in rates, while the other is, beyond a certain point, rigid and unyielding. It is this rigidity which makes it so difficult under the present system to provide for the undeveloped wants of the community, and thus secure or draw out, as it were, a large amount of travel that does not now exist. Passenger travel is partly a matter of business and partly pleasure and luxury, and in either case the price of tickets limits the amount of travel. There is no provision by which fares can be adjusted to individual wants and circumstances, so that when a higher rate cannot be had, a lower one can be accepted rather than haul empty cars over the road in trains that must go on time, whether the seats are filled or not. Our surburban trains come in full in the morning, and go out full in the afternoon. The reverse currents are comparatively light, and in the nature of the case must be so. But it is possible that quite a number of persons might be induced by half-fares to leave the city in the morning and return at night, just to enjoy the ride and see the country; but they cannot afford to pay full fares, and therefore, do not go. Yet there can be no question that the half-fares in such case would really be so much added to the income of the road, just as return freight on cars that have got to go to the other end of the line. will pay at any price that more than covers the cost of handling and the fuel consumed to haul its weight. These persons may be imagined to represent a class—and it may be a very large class—who cannot afford to travel at the regular and rigid fares, but who might be induced to do so at rates that would afford some profit. But inasmuch as persons cannot well be classified like things, especially when they ride in the same car, some other method must be devised. The class-cars of Europe enable people to classify themselves, and so choose whether they will pay low, medium or high fares, or not travel at all. The rigid fare system is in this way somewhat broken up, and a much greater number of people are induced to travel than if the cars were not classified and the fares uniform. The principal objection to this method is, that in order to keep up a line, every train must be made up of cars of each class, and especially the first-class, which are more likely to run empty a portion of the distance and thus reduce the profit on the others. The class system, however, as it exists in Europe, cannot be introduced in this country without dislocating society to some extent, and playing havoc with our cherished democratic traditions and prejudices. It has been suggested by some who have given much attention to the subject, that a regular graduation of fares according to time and distance would best meet the requirements of the case; and so it would if time and distance were in all cases a true measure of cost, which they are not. Such a system would also involve a great deal of detail and complication.

The running of excursion trains is increasing on our roads every year, especially in the vicinity of large cities. These trains, if managed so as to meet the wants of the people, are productive of a large traffic, and although they are run at greatly reduced fares, a substantial profit is realized without interference with regular traffic. The cars run full, and the low fare is what fills them. It is so much additional travel drawn out, or rather developed by circumstances, which the experienced passenger agent takes advantage of and turns to good account.

What has been said has reference to passenger mileage as a distinct thing from receipts or income. Its stationary condition in the face of an increasing population, is clearly not owing to any lack of fine cars, or to slow movement of trains, or any special liability to accident. The great majority of passenger cars are certainly fine enough to bar any further "progress" in that direction. If they were even twice as fine as they now are, the rates remaining the same, it would not increase the passenger mileage; but it possibly might be increased if the cars were a good deal cheaper and plainer than they now are, with a corresponding reduction of fares. The regular rates are evidently too high for the masses, but they can not well be reduced and save a profit. The excessive dead weight and costly construction and maintenance must be sustained by the traffic, be it more or less. The average well-conditioned day-car on any of the regular lines of travel, is none the less luxurious and heavy because it is common and carries all sorts of people. It is a costly thing to haul, and all the more so when, as is frequently the case, its seats are only half filled, thus increasing the proportion of dead weight and the cost of transporting the passengers carried. These considerations evidently have something to do with the problem of stationary mileage.

RAILWAY EMPLOYES AND SUNDAY WORK.

One of the peculiar hardships incident to railway service is the inability of a large portion of employés to enjoy these regular periods of rest which almost all other people enjoy. Every day-worker is in a better condition of mind and body when he has his regular night's sleep, and a regular respite from toil one day in seven. All human experience has shown that the one is as necessary as the other to preserve the health and ward off premature decay. There are of course individual exceptions, but they are not very numerous. The great Napoleon is said to have been one, but he was not. He died at the age of fifty-two. Many of our prominent railroad officials think they can keep up the tension of brain and nerve unremittingly with no bad results, but they are pretty sure to pay the penalty which nature exacts before they reach three-score. But we now refer more particularly to the exhausting duties of engineers and trainmen, and especially to those who have no Sunday rest. Aside from religious scruples, a suspension of toil on the first day of the week is a welcome relief, not because it is a thing of precedent and established usage, but because it is indispensable to the well-being of body and mind. A man can carry a load of fifty pounds a long distance with proper intervals of rest, but if he undertakes to carry it continuously he will soon break down. Hard work is not a good thing of itself, or abstractly considered, but only as a means to the attainment of certain ends; and these are a comfortable livlihood, social and family ties, moral and mental development, and provision against misfortune and old age.

It may be said that railway managers are slow to recognize the claims of employés in these respects, and that the running of passenger and freight trains on Sunday is a growing necessity which is bound to encroach more and more upon the time-honored observance of the one day of rest. But, admitting this, is it really the fault of the managers, or of the stockholders even? Not altogether, we venture to say. Managers, in their capacity as employers, may be hard-hearted and exacting, but they are themselves the servants of the stockholders, and behind the stockholders is the great and equally exacting public whose patronage each individual road is striving for. The demands of traffic and competition are imperative. The great mails must go day and night, and fast trains must carry them. The ordinary through travel must not be interrupted a whole day, and local excursion trains on Sunday are getting to be almost as much of a necessity in the public estimation as the running of ferry-boats or the putting out of fires. It may be asked, If traffic is suspended twenty-four hours every week, will not the profits be reduced in the same proportion? In our judgment they would certainly be reduced more or less. A large amount of passenger fares would be lost that would otherwise be received; time would be lost on thousands of tons of freight, and time in such case has a commercial value equivalent to coin, to say nothing of perishable articles that would be damaged by delay. It is manifestly impracticable to curtail Sunday work on railroads, or even to keep it where it is. The inevitable tendency is to increase the amount of it. It is the same in England. The only consolation for Sunday workers both there and here is, that they are paid for it. But the pay should be extra, or something more than they are paid for the same service on other days.

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ROLLING STOCK ESTIMATES.

The returns of rolling stock for all the roads in the United States as given in the current issue of Poor's Manual, are as follows:

Locomotive engines	17,084
Passenger cars	12,009
Baggage, mail and express cars	4,519
Freight cars of all classes	480,190

These figures are compiled from the reports of the road companies for 1879, some of which include the whole of that year and others only a part of it. Assuming that the aggegates are approximately correct, there should be added to them, in order to make the total for the year complete, any additional rolling stock that may have been made between the dates of the reports and the close of the calendar year. The number of engines and passenger train cars being smaller and more easily ascertained than the number of freight cars, the returns in regard to them are more likely to be correct. The freight cars, however, are not reported with sufficient accuracy by all the roads to enable a general estimate to be made with anything like exactness; and it is still more difficult to classify them so as to show the total number of each kind in the whole country. Taking the data afforded by the Manual, an estimate may be made of the increase of rolling stock within the past five years, or the difference in the number of engines and cars owned by the roads and presumed to be in serviceable condition in 1874 and 1879, as follows:

	1874.	1879.	Increase.
Locomotives	14,165	17,084	2,919
Passenger cars	9,502	12,009	2,507
Baggage, mail and express	3,757	4,519	762
Freight cars (all classes)	345,920	480,190	134,270

This includes trust and leased cars and engines, and the great majority of service cars, but does not include the Canada roads, which had 774 engines in 1874, as against 1,085 in 1879; and 13,980 cars of all kinds in 1874, as against 25,048 in 1879, showing an increase within the same period of 311 engines and 11,068 cars.

A large proportion of the increase, both in Canada and the States, has doubtless been made within the years 1878 and 1879, and if we add to the above estimates the new stock built during the present year, the total amount will be increased very considerably, especially the number of freight cars. According to the Manual, the increase in this class of cars during 1879 was 57,177, and, considering the extraordinary demand for new stock since last fall, it would, perhaps not be amiss to add 50,000 to the figures for 1879, making the total number of freight cars now on the United States roads a little more than 530,000, and showing an increase of 184,000 since 1874, or an average of 40,000 a year for five years. This is not surprising, however, in view of the immense increase of tonnage for the same period; and it indicates a steady activity in car construction in the immediate future to meet the growing demand for transportation.

It would be very desirable if something like an accurate classification could be made of freight car stock in the aggregate, but, owing to the imperfect data at hand for doing so, the attempt would result in nothing more or better than good guessing.

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COMMITTEE ON FREIGHT TRAIN BRAKES.

In the list of committees of the Master Car-Builders' Association printed in our last issue, the names of three of the members of the Committee on Train Brakes for Freight Cars, were inadvertently omitted. The committee is as follows, its former size having been increased at the June annual meeting by two additional members:

C. E. GAREY, New York & Harlem R. R.
GEORGE HACKETT, Central of New Jersey.
L. GAREY, New York Central & Hudson River.
J. P. COULTER, Ohio & Mississippi.
THO. AYLESBURY, Kan. City, St. Jo. & C. Bluffs.

Communications intended for the committee should be addressed to C. E. Garey, Chairman, Morrisania, N. Y.

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THE Master Car-Painters will hold their annual convention at St. Louis, on the 15th of September. The subjects to be discussed embrace a variety of points in reference to the exterior treatment of passenger cars and locomotive tenders in the paint shop. The mere dress which these vehicles there receive is apt to be regarded as a matter of secondary importance as compared with the more substantial work of construction. In a certain sense this is so; but as in the case of individual persons, the dress is not only indispensable but it involves the elements of utility, economy, propriety and fitness. The experience of those who have made car-painting their sole business for many years, instead of reaching definite and settled conclusions with respect to the quality of ingredients and the best methods of applying them, has been productive of many conflicting views. This is manifest from the interrogative form in which the topics to be considered are presented, each one of which is pretty sure to elicit discussion and bring out the information that is needed. This is the chief, and indeed the only advantage to be derived from these meetings; and in order to reap the greatest practical benefit from them, master and foreman painters should have every facility afforded them to attend. The fact that the art of car-painting has been greatly developed in the past is only an evidence that it is capable of still further advancement. Whatever is to be attained, however, in the way of better work, must necessarily come through the efforts of the painters themselves who are practically familiar with all the technicalities of the craft, and not from the ideas and notions of managers and high officials, who as a rule know little or nothing about it. That car painting is becoming more and more a specific art, and that it is getting to be appreciated as its importance demands, is evident from the frequent inquiries that are made for books which treat upon the subject, but of which, so far as we know, there are none in existence, or at least no treatise that deals with the subject in a thorough and practical way.

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MORE COLOR-BLIND AGITATION.

Connecticut is, we believe, the first state to pass a law prescribing certain regulations to be observed by railroad companies in regard to this subject. If all the other states should follow suit, and each of them enact a law as crude, vexatious, unjust and annoying as this pioneer specimen, the skilled ophthalmic experts all over the land may safely count upon having a good time, however it may be with locomotive engineers and others who have rendered long and acceptable service upon our best managed roads. There is sure to be blundering, shortsighted work, when legislators who have no practical and scarcely any correct theoretical knowledge of railroad operation, undertake to remedy supposed defects in the system which in some unaccountable way have escaped the notice of the shrewdest and most capable managers; and the liability to blunder is none the less when the mercenary greed of a selected corps of professional experts is to be satiated at the rate of two dollars a head for the great army of railway employés whose duties require them to have anything to do with the form and color of signals. We have not seen the full text of the law, but as we understand its provisions, it requires not only that all the present employés shall be examined, but all new applicants, and also subsequent periodical re-examinations of these same persons to see if their eyes remain all right. The makers of the law appear to assume that the eyes of the examiners are necessarily perfectly normal, although one person is as likely to be color-blind as another, and just as likely to be ignorant of the fact that he is so until some one else finds it out. The law also assumes that railroad companies, although they have paid enormous sums to compensate passengers for injuries, are quite indifferent to the matter of accidents in their effect upon earnings and profits. And so the companies must be taken in hand, and reliable and long-tried engineers who have never had an accident on the road, driven from service because they can't read letters three-eighths of an inch long at a distance of 25 feet, or sort colored worsteds in a scientific manner, or see red and green precisely as some other people do, although they are able to discriminate just as sharply between the two, and be as little liable to confound or mistake one for the other. This unwarranted outside interference with the affairs of railroads in a matter with which the companies are far more competent to deal than are a horde of hungry professional experts, will have its day like every other new-born craze that starts up. As well pass laws prohibiting the running of cars without brakes, or locomotives without head-lights, and appoint a lot of examiners to make monthly reports at so much per train, just as if the general run of road managers were so stupid as not to understand their own business well enough to adopt the most obvious and necessary safeguards against accidents. The logic of facts shows conclusively that the danger from color blindness, about which such a hue-and-cry has been raised, is greatly exaggerated, and that in no single one of the many careful and searching investigations that have been in all the past history of railroads, has the cause of an accident been traced to color-blindness, nor has this particular cause even been suggested or suspected, so far as we have been able to ascertain from the record.

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SOME FIGURES FOR GRANGERS TO STUDY.

If those who participated in the formidable Granger movement a few years ago, and raised such a clamor for the regulation of fares and rates by legislative interference, could have had a foresight of the figures in Poor's Manual for 1880, their fears of railroad monopoly would have been very much lessened. These figures show very clearly that the alarm that was then sounded through the land was based upon a mistaken view of the nature of railway corporations, and the relations between them and the great productive and mercantile interests of the country. Although railroad business has been constantly growing, it has not proved to be an odious monopoly levying its tribute upon an unwilling community in the form of oppressive freight charges. The result has, on the contrary, been quite the reverse. Instead of advancing rates, there has been a steady decline from year to year, until it would almost seem that the vanishing point, as regards any margin of profit, had been reached; and this in the face of a steadily increasing volume of traffic. The rates of freight that have ruled during the past year would have been considered ruinous five years ago, and would really be so now were it not for the greatly increased tonnage, and the very considerable reduction in operating expenses as compared with what they were formerly.

The general decline in rates is shown in the Manual in the reported operations of 13 leading roads, from 1873 to 1879 inclusive, and doing from one-quarter to one-third of all the railroad business of the country. Upon these lines the average rate per ton per mile in 1873 was 1.77 cents, and 1.02 cents in 1879, which is a decrease of more than 42 per cent during the seven years. And yet, in the face of this large decline, the earnings of these roads from their freight traffic have been increased nearly 4 per cent. It is estimated that had the rates of 1873 been maintained on these roads in 1879, their receipts for the latter year would have been $230,618,000 instead of $116,311,000, and that the total receipts from freight of all the roads would have been $922,475,000 instead of $386,676,000. It should also be noted that the dividends paid in 1879 were $8,052,102 more than in 1878, and only $5,439,339 less than in 1873. There has also been a great reduction of funded and floating indebtedness within the past year, by transfers to capital stock through processes of reorganization.

From this it appears that the roads have done a prosperous business by an increased tonnage and in spite of reduced rates, and that the public has at the same time received all the benefits of the reduction. The Granger element has profited equally with others, not by keeping up a crusade against railroads, but by ceasing their clamor and allowing the inevitable laws of trade and production to have their own way. The marvelous increase of railway tonnage within the last decade indicates a corresponding increase in the future, so that from the present outlook it is difficult to set any limits to railroad development and the growth of railroad business in this country. The new construction that is now in progress is mostly, if not all of it, legitimate and not speculative. It is not based upon fictitious capital. A large proportion of it is required to meet the demands of traffic, and consists in extensions of existing lines, or important feeders to give new regions access to the markets.

Progress appears to be making at the west in the matter of ascertaining the difference between a a nominal car load and a real one. It has been ascertained upon careful investigation, that while the nominal figure is 20,000 pounds, the real figure ranges from 28,000 to 32,000 pounds, making a difference of 17 to 35 per cent. in rates, when the freight is billed at the nominal car load. Such transactions do not imply any very great smartness on the part of shippers or carriers. It is an old abuse, and will probably be older still before it ceases to be practiced. When there is no hidden inducement to carry freight except at stipulated rates per 100 pounds, it is not only unbusinesslike but inexcusable to carry at under-billed weights. It is easy to cheat when the cheated parties consent to the imposition.

The Engineer's Handy Book.—This compact and comprehensive little volume contains a vast amount of information relative to the care and management of every class of steam-engines. It is profusely illustrated, and abounds in facts, figures, rules, tables, questions and answers, formulæ, etc., that are exceedingly valuable to engineers, and of easy reference by means of a copious and well-arranged index. The various subjects are discussed with brevity and clearness, and with a freedom from technicality which enables the reader to get at the pith of the matter without fishing it out from an ocean of words. A prominent feature of the book is a full explanation of the steam-engine indicator, and its use and advantages to engineers and others. The long experience of the author in this branch of engineering and the numerous publications he has already issued upon kindred subjects, give an additional value to the present treatise. It is printed on thin paper and in clear type, and contains 678 pages. Flexible tuck binding, gilt edge, suitable for the pocket. By Stephen Roper, Engineer. E. Claxton & Company, Publishers, Philadelphia.

The Railway Engineer (London).—This is a monthly publication, which was begun with the present year, and of which we have received the first seven numbers. It is exclusively devoted to railway engineering, or whatever pertains to the construction, equipment and management of railroads both in Great Britain and elsewhere. The regular issues thus far are not only well sustained as to the varied and interesting character of their contents, embracing original and selected articles of permanent value, but each number contains from four to six large folded lithographic plate illustrations of rolling stock and other construction, of great practical importance. It is superbly printed upon fine heavy paper, and is in all respects a first-class journal, that can hardly fail of being appreciated by all who are in any way interested in current railway literature. Price, £1 1s. per annum; 12 Crane court, Fleet street, London.

A paragraph appeared in our last issue stating that 25 locomotives recently built by the Providence Company for the Manhattan Elevated Railroad, weighed in working order 14,750 pounds each. This is an error. Their average weight in working order is 42,600 pounds.

The Winslow Safety Car Stove is too well known and too widely appreciated to need any special commendation. It is doubtful whether all the conditions of car heating and ventilation can be more fully provided for by any similar apparatus that ingenuity can devise. The warm air is distributed through the car uniformly, and its volume changed every few minutes. It also serves as an efficient ventilator in the summer by keeping up an inflowing current through the registers, and a corresponding outward current through doors and windows, which prevents the entrance of dust and cinders. The apparatus is simple, compact, safe, durable and ornamental, and should find a place upon all cars where the comfort of passengers is a leading consideration. Manufactured by A. P. Winslow & Co., Cleveland, Ohio.

The Searle Heater Co., of Cincinnati, have issued an illustrated descriptive catalogue of car heaters manufactured by them, containing details of construction and directions for using Fresh Water Heater and Automatic Fire Extinguisher for drawing-room and sleeping cars, and also furnishing hot and cold and water for toilet rooms. The leading features claimed for the apparatus are the use of fresh water and perfect control of its circulation, a uniform heat, self-feeding fire, and rotating fire-pot by which ashes and cinders are deposited in a cylinder under the floor without disturbing the fire in the heater. The heater weighs 300 pounds, has no jacket or fender, occupies a small space, and is neat and ornamental in appearance.

Bissell & Co., of Pittsburg, Pa., have contracted to furnish the Cleveland, Columbus, Cincinnati & Indianapolis road with their new pattern of safety car stove in time for the coming winter, replacing with it all the old stoves heretofore used. They are also supplying them to the Pittsburg, Fort Wayne & Chicago and its connections; the Cleveland & Pittsburgh, Cleveland, Tuscarawas Valley & Wheeling, and other western lines.

A railway employé on one of the English roads applied on a Saturday night for a pass to visit his family. "You are in the employ of the railroad?" asked the gentleman applied to. "Yes." "You receive your pay regularly?" "Yes." "Well, now, suppose you were working for a farmer instead of a railroad, would you expect your employer to hitch up his team every Saturday night, and carry you home?" This seemed a poser, but it wasn't. "No," said the man, promptly, "I wouldn't expect that; but if the farmer had his team hitched up, and was going my way, I should call him a darned mean cuss if he would not let me ride." Mr. Employé came out three minutes afterward with a pass good for three months.

A vagrant ass, says the San Antonio *Herald*, stood beside the track of the Sunset Railway a few mornings ago, when an engine moved slowly up and stopped within a few feet of him. The engineer blew one of those terrible screams, prolonged and piercing—such a blast as makes a sleeping Millerite dream of the day of judgment. Did the ass scare? Not worth a cent! Did he shake the sloth from his limbs, erect his tail, and speed away like the asses of Bassorah, faster than the Bedouin coursers ran back to the chaparal? No, he didn't. He turned one ear to the engine, just as a deaf man uses his tin ear-trumpet, and caught every particle of the sound. And just as the engine's whistle ceased its notes and all the echoes died away, the animal straightened out his neck, opened his mouth, and in a voice that deafened all the railroad men and caused the freight clerk to drop his pen, roared:—"I can't! I can't! I can't! I can't! I can't be beat! be beat! I c-a-n't be-be-be-be beat!"

Our Directory.

We note the following changes since our last issue. Readers are requested to give us prompt notice of changes when they occur:

Burlington & Missouri River in Nebraska.—Mr. J. O. Phillipi has been appointed Superintendent of the First Division of this road, with headquarters at Lincoln, Neb.

Central Pacific.—Mr. J. A. Fillmore, heretofore Master of Transportations has been appointed General Superintendent, vice E. C. Fellows, deceased.

Chicago & Alton.—Mr. J. C. Monro has been appointed Master Mechanic of the Kansas City & St. Louis Division, with headquarters at Mexico, Mo.

Cincinnati, Sandusky & Cleveland.—Mr. Joseph L. Porter, who has heretofore been foreman of the roundhouse of the company at Springfield, has been appointed Master Mechanic, vice B. J. Gregg, deceased.

Fort Wayne & Jackson.—Mr. H. A. Raymond, heretofore Purchasing Agent, has resigned, and the office has been discontinued.

Gulf, Colorado & Santa Fe.—Mr. O. H. Dorrance has resigned the position of General Superintendent which he has held for a number of years. Mr. W. H. Martin has been appointed Foreman of Car Repairs, with headquarters at Galveston.

Indianapolis, Decatur & Springfield.—Mr. E. H. Goodrich has been appointed Superintendent, vice Mr. H. S. Morse, resigned. He was formerly Superintendent of the Milwaukee & St. Paul.

Memphis & Little Rock.—Mr. James Harrington has been appointed General Manager, in place of Rudolph Fink, who has gone to the Selma, Rome & Dalton. Mr. Harrington has been for some time Chief Engineer and Land Agent of the company.

Midland of New Jersey.—This is the new name of the New Jersey Midland. Mr. H. M. Britton, formerly of the New York & New England, has been appointed General Manager and Superintendent.

New York, Lake Erie & Western.—Mr. Charles O. Vedder has been appointed Master Mechanic of the Buffalo Division, in place of Thomas West, resigned.

Northwestern of Georgia.—Mr. Lyman Wells has been appointed Superintendent, vice R. H. Bernard.

Ohio Central.—Mr. John B. Morgan has been appointed Master Mechanic. He was recently on the Cincinnati, LaFayette & Chicago road.

Quebec, Montreal, Ottawa & Occidental.—Mr. W. E. Blumhart has been appointed Purchasing Agent, vice Mr. A. McPherson.

Southern Pacific.—Mr. W. G. Curtis has been appointed Superintendent of the Arizona Division. He was previously Superintendent of the Stockton & Copperopolis road.

Springfield & Northwestern.—Mr. E. B. Hyde has been appointed Superintendent, vice Mr. G. N. Black, resigned.

Syracuse, Chenango & New York.—Mr. Albert Allen, assistant of General Manager A. C. Belden, and formerly a conductor on the Morris & Essex Branch of the Del., Lack. & Western, has been appointed Superintendent.

West Chester & Philadelphia.—A change has been made in some of the officers of this road. Mr. Henry Wood is now President and Superintendent.

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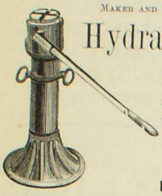

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Is worth 4.82	**times**	**as much**	**as Sperm Oil.**
" **12.33**	**"**	**"**	**Lard Oil.**
" **9.25**	**"**	**"**	**W. Va. Oil.**
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EXTRACT FROM REPORT OF PROF. THURSTON.

* * * * * * * * *

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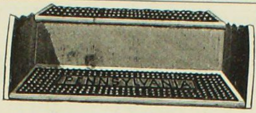
REFERENCES:

C. & N. W.—C., A. & St. L.
Mo. Pac.—P. Ft. W. & C.
Wab., St L. & P.—Kas. Pac.
Union Line—P. C. & St. L.
M., K. & T.—K. C., St. J. &C. B.
K. C., F. S. & G.—A. T. & S. F.
Grand Trunk—L. E. & W., etc.



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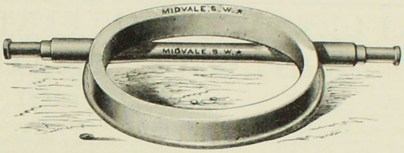

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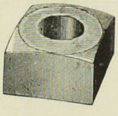

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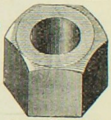

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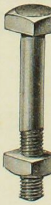

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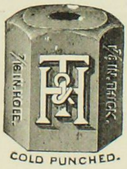

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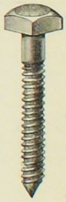

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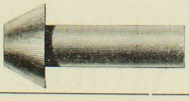

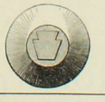

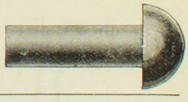

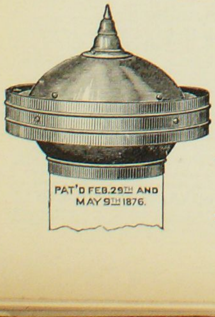

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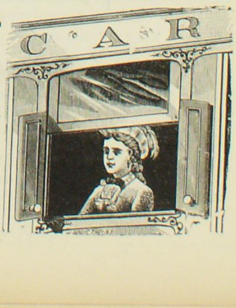

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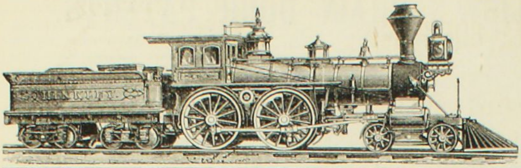

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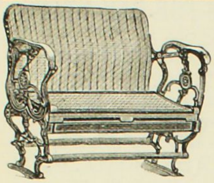

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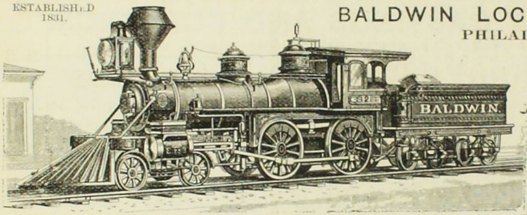

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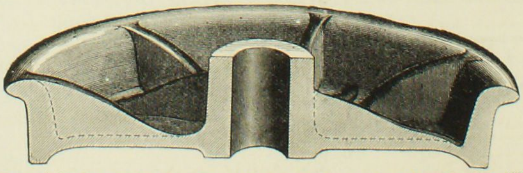

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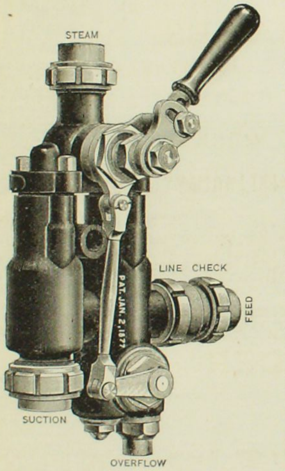

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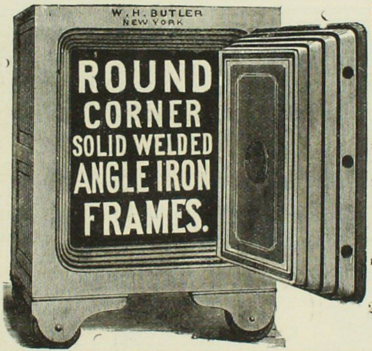

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Fig. 1

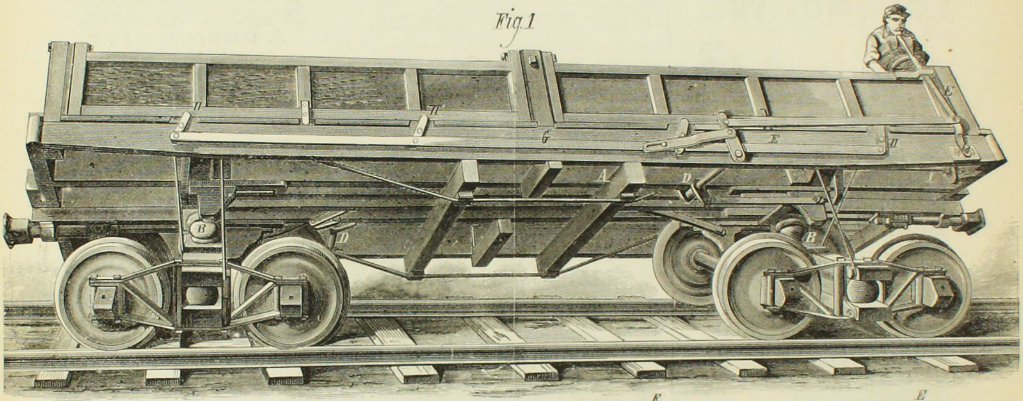


Fig. 2

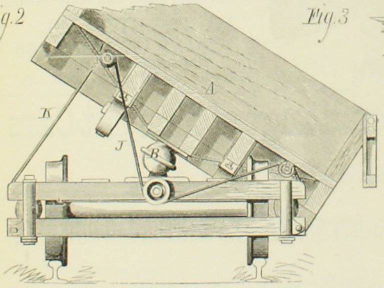
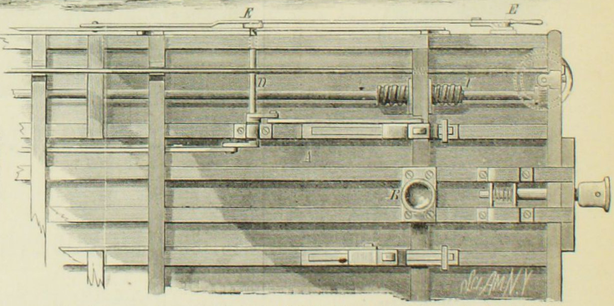


Fig. 3



NEW DUMP CAR.

We present herewith engravings of a new dumping car, patented by Mr. Matthew Van Wormer, of Dayton, O., and now being introduced by the New England Car Company, of 48 Congress street, Boston, Mass. This car posesses many points of novelty which are covered by separate patents. It has been improved from time to time until, as it now stands, it appears to fulfill all the requirements. In its construction it is as simple as well can be when all of its functions are considered. It is a full-sized gondola car, and capable of running with the same steadiness and security as the ordinary cars of the same size, while at the same time it is as perfectly manageable as a common dumping-wagon.

Fig. 1 shows the entire car in perspective while being dumped; fig. 2 is a vertical transverse section, taken just in front of one of the trucks; and fig. 3 is an inverted plan view, showing the apparatus for moving the side bearings.

This operation removes the side bearings of one side of the car and puts it in position to be dumped. Upon the outer end of the rock shaft there is a lever, E, which is connected with the lever, F, at the side of the car near its end. The lever E is connected with a bar, G, extending along the side of the car, and pivoted to four or more lever catches, H, which hold the side doors of the car in position to retain the load. By this arrangement of the levers and their connections the car doors may be released and the supports, B, moved, making the car ready to dump. The apparatus for dumping the car is very simple and effective, and capable of holding the car platform at any desired angle. It consists of a long shaft, I, extending along the body of the car, and provided at one end with a worm-wheel, which is engaged by a worm on a vertical shaft extending upward through the platform of the car, and provided with a lever or wheel by which it may be turned.

Upon drums carried by the shaft, I, are two drums, upon each of which are wound two chains, J K. The chain, J, runs downward around a sheave on the truck timber, thence upward over a sheave on the car body, then downward to the end of the truck timber, where it is secured. The chain, K, runs directly down to the truck timber. By turning the shaft, I, in one direction the car is dumped on one side of the track, and by turning it in the other direction the load is discharged on the opposite side of the track. This result is secured by winding one of the chains, I J, while the other is unwound. The worm-gear affords ample leverage for operating the shaft, I, so that the car may be dumped by one man standing on the platform.

The merits of this dumping car will be understood and appreciated by railroad engineers, superintendents and managers, who are familiar with the imperfections of the ordinary cars.

Any further information in regard to this invention may be obtained by addressing the New England Car Company, 48 Congress street, Boston, Mass. Mr. Simeon Brownell is general manager and sole agent for the United States.

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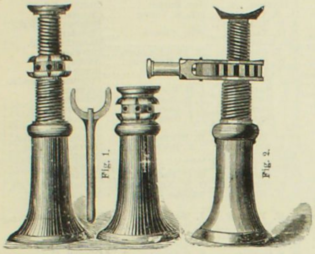

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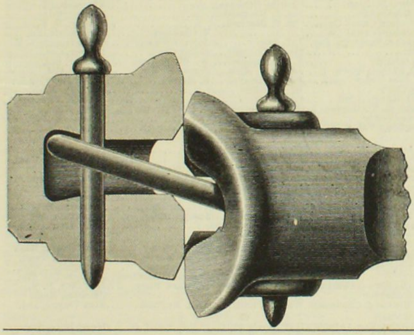

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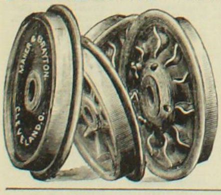

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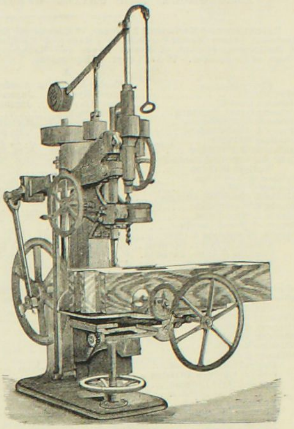

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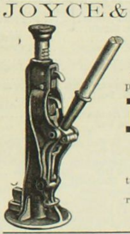

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Boston & Lowell	J. F. Crockett	J. F. Crockett	Boston, Mass.
Boston & New York Air-Line			New Haven, Conn.
Boston, Revere Beach & Lynn	J. L. Folsom	John Coghlan	Boston, Mass.
Brunswick & Albany			Brunswick, Ga.
Burlington & Missouri River in Neb.	D. Hawksworth	D. Hawksworth	Plattsmouth, Neb.
Burlington, Cedar Rapids & Nor.	R. W. Bushnell		Cedar Rapids, Ia.
Burlington & Southwestern		A. B. Allen	Farmington, Ia.
Buffalo & Southwestern	J. G. Hubbard		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Allen Vail		Buffalo, N. Y.
C			
Cairo & St. Louis	**G. B. Simonds	G. B. Simonds	E. Carondelet, Ill.
Cairo & Vincennes	A. Van Tuyl	A. Van Tuyl	Carmi, Ill.
California, Pacific & Northern	D. Rutherford	D. Rutherford	So. Vallejo, Cal.
Camden & Atlantic	Rufus Hill	S. Wills	Camden, N. J.
Canada Central	H. J. Marshall		Brockville, Can.
Canada Southern and Branches	*John Ortton	John Ortton	St. Thomas, Ont.
Canada Division	W. A. Short		St. Thomas, Ont.
U. S. Division	O. P. Dunbar		Grosse Isle, Mich.
Carolina Central	§Jas. Maglenn	S. R. Ethridge	Laurinburg, N. C.
Catasauqua & Foglesville	Tho. E. Evans	Chas. J. Holbach	Catasauqua, Pa.
Central of Georgia	D. D. Arden		Savannah, Ga.
Atlanta Division	D. M. Gugel	Jas. A. Knight	Macon, Ga.
Central of New Jersey	Wm. Woodcock	George Hackett	Elizabeth, N. J.
Lehigh & Susquehanna Div.	L. C. Brastow	L. C. Brastow	Wilkesbarre, Pa.
Central of Iowa	M. C. Wheeler	T. L. Seevers	Marshalltown, Ia.
Central Pacific	‡A. J. Stevens	††Benj. Welch	Sacramento, Cal.
Western Division	Geo. D. Welch	‖W. B. Ludlow	Oakland, Cal.
Central Pacific		‖G. J. Turner	Sacramento, Cal.
Visalia Division	S. Johnson		Tulare, Cal.
Sacramento & Oregon Div.	M. W. Cooley	Phi. Douglass	Sacramento, Cal.
Truckee Division	Geo. Gregg	‖Wm. McPherson	Wadsworth, Nev.
Humboldt Division	W. F. Smith	‖J. C. Doughty	Carlin, Nev.
Salt Lake Division	Jas. Lamb		Terrace, Utah.
Salt Lake Division		‖A. Sherburne	Ogden, Utah.
Central Vermont	§§J. M. Foss		St. Albans, Vt.
New London & Northern Div.	I. W. Dow	S. O. Banks	New London, Conn.
Rutland Division	N. L. Davis	N. L. Davis	Rutland, Vt.
Chesapeake & Ohio	§John McFarland	J. N. King	Richmond, Va.
Chesapeake & Ohio	Tho. L. Chapman	H. C. Bassinger	Huntingdon, W. Va.
Cheraw & Darlington	John Bissett	W. H. Day	Florence, S. C.
Cherokee	C. E. Scruton		Cedartown, Ga.
Cheshire	F. A. Perry	‖A. E. Howard	Keene, N. H.
Charlotte, Columbia & Augusta		J. C. Troeger	Columbia, S. C.
Charleston & Savannah	H. A. Ulmo	J. D. Murphy	Charleston, S. C.
Chicago & Pacific	James Penny	C. N. Code	Chicago, Ill.
Chicago & Northwestern	** Geo. W. Tilton	††William Campbell	Chicago, Ill.
Wis., Mad. & Mill. Divis.			Chicago, Ill.
Galena Division			Chicago, Ill.
Iowa Division	J. O. Chapman	H. L. Preston	Clinton, Ia.
Peninsula Division	Geo. White		Escanaba, Mich.
Winona & St. Peters Div.	W. A. Scott	W. A. Scott	Winona, Minn.
Chicago & Alton	§§Wm. Wilson		Bloomington, Ill.
Kansas City & St. Louis Div.	J. C. Morse		Mexico, Mo.
Chicago, Burlington & Quincy	§§H. B. Stone	*J. Chistiansen	Aurora, Ill.
Galesburg Division	Robert Colville		Galesburg, Ill.
Iowa Division	Joel West		Burlington, Ia.
Iowa Division	C. W. Eckerson		Creston, Ia.
St. Louis Division	H. Whiting		Beardstown, Ill.
Chicago & Springfield	W. B. McKenna		Clinton, Ill.
Chicago, Clinton, Dubuque & Minn.	E. Smedley	E. Smedley	Dubuque, Ia.
Chicago, Rock Island & Pacific	‡T. B. Twombly	B. K. Verbryck	Chicago, Ill.
Keokuk & Des Moines Div.	S. W. Wakefield	Henry Kummer	Keokuk, Iowa.
Southwestern Division	R. O. Carscadin		Trenton, Mo.
Chicago & West Michigan	Russell Booth		Muskegon, Mich.
Chicago & Eastern Illinois	Allen Cooke	Allen Cooke	Danville, Ill.
Chicago & Iowa	H. S. Bryan		Aurora, Ill.
Chicago & Grand Trunk	†K. Blackwell	Geo. W. Prescott	Battle Creek, Mich.
Chicago, Milwaukee & St. Paul	J. M. Lowry		Milwaukee, Wis.
La Crosse & P. Du. Ch. Div.		John Bailie	Milwaukee, Wis.
Northern Division		Wm. E. Kittredge	Milwaukee, Wis.
Iowa & Minn. Division	J. O. Pattie		Minneapolis, Minn.
Racine & S. West Div.	John Taylor	E. A. Eddy	Racine, Wis.
Sioux City & Dak. Div.	J. H. Moulton		Yankton, Dak.
Southern Minnesota Div.	J. B. Henney	J. B. Henney	Hokah, Minn.
Chicago & Paducah	T. J. Grosh	T. J. Grosh	Streator, Ill.
Chicago, Pekin & Southwestern	A. R. Overton		Joliet, Ill.
Chicago, Pekin & Southwestern		F. Shields	Streator, Ill.
Chicago, St. Louis & New Orleans	**W. H. Purdy		McComb C'y, Miss.
Chicago, St. Louis & New Orleans	E. D. Anderson		McComb C'y, Miss.
Chicago, St. Louis & New Orleans	J. M. Keith		Jackson, Tenn.
Chicago, St. Louis & New Orleans	J. F. White		Water Valley, Miss.
Chicago, St. Paul & Minneapolis	Matt Ellis	J. C. Fischer	Hudson, Wis.
Cincinnati, Wabash & Michigan	S. B. Tinker	S. B. Tinker	Wabash, Ind.
Cincinnati, Hamilton & Dayton	James Eckford	W. H. H. Allison	Cincinnati, O.
Indianapolis Division	Edward Moore		Indianapolis, Ind.
Cincinnati, Lafayette & Chicago	J. B. Morgan	J. B. Morgan	Lafayette, Ind.
Cincinnati, Richmond & Chicago	Wesley S. Brewer		Richmond, Ind.
Cin. Rockport & So. Western	B. W. Smith	J. H. Bauman	Rockport, Ind.
Cincinnati, Sandusky & Cleveland	Jos. L. Porter		Sandusky, O.
Cincinnati Southern	J. Ivanson	Geo. Butler	Ludlow, Ky.
Cleve., Col., Cin. & Indianapolis	‡L. S. Young	††L. S. Young	Cleveland, O.
Indianapolis Division	A. R. McAlpine		Brightwood, Ind.
Columbus & Cin. Division	F. G. Kaufholz	Wm. Cleave	Cleveland, O.
Cleveland & Marietta	Tho. Robertson		Marietta, Ohio.
Cleveland & Pittsburg	N. E. Chapman	‖A. Steinbrunner	Cleveland, O.
Cleve., Mt. Vernon & Columbus	J. W. Holloway	J. W. Holloway	Akron, O.
Cleve., Tusc. Valley & Wheeling	W. F. Turreff	‖Geo. H. Pratt	Black River, O.
Cobourg, Peterboro & Marmora	Wm. Polson		Cobourg, Canada.
Columbus & Hocking Valley	I. G. Hutchins	J. M. Rockafield	Columbus, O.
Columbus & Toledo	I. G. Hutchins	J. M. Rockafield	Columbus, O.
Concord	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Portsmouth	J. T. Gordon	J. T. Gordon	Concord, N. H.
Concord & Claremont	**J. N. Lauder		Concord, N. H.
Connecticut River	§Wm. H. Stearns	R. Hitchcock	Springfield, Mass.
Connecticut Valley	S. E. Brewer	S. E. Brewer	Hartford, Conn.
Connecticut Western	John C. Barton		Hartford, Conn.
Conn. & Passumpsic Rivers	John R. Hubbard		Lyndonville, Vt.
Corning, Cowanesque & Antrim	O. C. Patchell	O. C. Patchell	Corning, N. Y.
Cumberland Valley	A. S. Hull	G. W. Nitterhouse	Chambersburg, Pa.
Cumberland & Pennsylvania	N. W. Howson	Nathan Binnix	Mt. Savage, Md.
D			
Dak. So. & Sioux City & Pembina	J. H. Moulton	J. H. Moulton	Yankton, Dak.
Danbury & Norwalk	N. M. George	N. M. George	Danbury, Conn.
Danville & Southwestern	B. L. Baldwin		Danville, Ill.
Davenport & Northwestern	H. E. Woods		Davenport, Ia.
Dayton & Union	H. S. Gordon	H. S. Gordon	Dayton, O.
Dayton & Southeastern	Wm. E. Cooper		Dayton, O.
Dayton & Michigan	John Black		Lima, O.
Delaware, Lackawanna & West	Walter Dawson	Robert McKenna	Scranton, Pa.
Morris & Essex Division	W. H. Lewis		Kingsland, N. J.
Morris & Essex Division		J. W. Baker	Dover, N. J.
Oswego & Syracuse Division	James Buchanan		Syracuse, N. Y.
Utica, Chenango & Susq. Div.	Tho. Thatcher		Utica, N. Y.
Bloomsburg Division	Charles Graham		Kingston, Pa.
Delaware & Chesapeake	Jos. A. Baynard		Easton, Md.
Delaware & Hudson Canal Co	**R. C. Blackall		Albany, N. Y.
Delaware & Hudson Canal Co		T. Orchard	Carbondale, Pa.
Rensselaer & Saratoga Div.	J. L. Corey	John Wicks	Green Island, N. Y.
Denver Pacific	§R. McDougall	‖John Clock	Denver, Col.
Denver & Rio Grande	N. W. Sample	N. W. Sample	Denver, Col.
Denver, South Park & Pacific	James H. Kirk	James H. Kirk	Denver, Col.
Des Moines & Fort Dodge	John McGrayel	R. Merrill	Grand Junction, Ia.
Detroit & Bay City	R. P. Baillie		Bay City, Mich.
Detroit, Grand Haven & Mil	Fred Parker		Detroit, Mich.
Detroit, Lansing & Northern	G. C. Watrous	G. C. Watrous	Ionia, Mich.
Dorchester & Delaware			Cambridge, Md.
Dunkirk, Allegheny Val. & Pitts	J. C. Haggett	J. C. Haggett	Dunkirk, N. Y.
E			
East Broad Top	Wm. C. Maynes		Orbisonia, Pa.
Eastern	J. D. Billings		East Boston, Mass.
Eastern Kentucky	D. L. Weaver	D. L. Weaver	Riverton, Ky.
E. Tennessee, Virginia & Georgia	C. A. Hodge	Joseph Armbruster	Knoxville, Tenn.
Erie & Pittsburg	J. N. Wood	J. N. Wood	Erie, Pa.
Eureka & Palisade	J. M. Alson		Eureka, Nev.
European & North Am. (of Maine)	A. O. Bailey	A. O. Bailey	Mattawamke'g, Me.
Evansville & Terre Haute	John L. White	Joseph Stiker	Evansville, Ind.
Evansville, Terre Haute & Chic	§§W. D. Macfarlane		Terre Haute, Ind.
F			
Fitchburg	§§Geo. A. Cooledge	Enos Varney	Charlestown, Mass.
Vermont & Mass. Div.	W. A. Foster	Jacob Marsh	Fitchburg, Mass.
Flint & Pere Marquette	T. J. Hatswell	T. J. Hatswell	E. Saginaw, Mich.
Florida Central	James S. McElroy	James S. McElroy	Jacksonville, Fla.
Flushing, North Shore & Central	Thomas Meehan	‖Edward Riley	L. I. City, N. Y.
Fort Wayne & Jackson	C. W. Hollister		Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	Wm. McPhail	Wm. McPhail	Fort Wayne, Ind.
G			
Galv., Harrisburg & San Antonio	D. T. Davis		Harrisburg, Tex.
Galveston, Houston & Henderson	R. B. Small		Galveston, Tex.
Geneva, Ithaca & Sayre	J. N. Weaver		Waverly, N. Y.
Geneva, Ithaca & Sayre		E. R. Brown	Packerton, Pa.
Georgia	John S. Cook	T. M. Preval	Augusta, Ga.
Grand Haven	A. S. Parish		Allegan, Mich.
Grand Tower & Carbondale	Hugh Smith	Hugh Smith	Grand Tower, Ill.
Grand Trunk	†Herbert Wallis	Wm. McWood	Montreal, Canada.
Grand Trunk	‖Warren Noyes		Gorham, N. H.
Grand Trunk		‖Duncan Menish	Portland, Me.
Grand Rapids & Indiana	J. M. Boon		Fort Wayne, Ind.
Grand Rapids & Indiana	‖J. R. Fish	‖J. R. Fish	Gr'nd Rapids, Mch.
Grayville & Mattoon	C. H. Cory		Mattoon, Ill.
Great Western, of Canada	†C. K. Domville		Hamilton, Can.
Great Western, of Canada	C. F. Hanson	Henry Childs	London, Ont.
Green Bay & Minnesota	‖Edw. Osborne		Green Bay, Wis.
Greenville & Columbia	W. J. Parrish		Helena, S. C.
Gulf, Colorado & Santa Fe	Geo. B. Nicols	‖W. H. Martin	Galveston, Texas.
H			
Hanover Junction & Gettysburg	John J. Bingley	Henry Britcher	Hanover, Pa.
Hannibal & St. Joseph	Tho. G. Gorman	Tho. G. Gorman	Hannibal, Mo.
Havana, Rantoul & Eastern	J. McCarthy		Rantoul, Ill.
Housatonic	N. Slingland	J. J. Ferris	Falls Village, Conn.
Houston, East & West Texas	J. E. Wiggin		Houston, Tex.
Houston & Texas Central	L. C. Noble	James McGee	Houston, Tex.
Huntingdon & Broad Top	Wm. Barkla		Saxton, Pa.
I			
Illinois Central	**S. J. Hayes	W. B. Snow	Chicago, Ill.
Chicago Division	Henry Schlacks		Chicago, Ill.
South Division	David Oxley		Centralia, Ill.
North Division	J. B. Edams		Amboy, Ill.
Iowa Division	Thomas W. Place		Waterloo, Ia.
Springfield Division	W. B. McKenna		Clinton, Ill.
Illinois Midland	H. H. Osborn		Paris, Ill.
Illinois & St. Louis	J. H. Smith		Belleville, Ill.
Illinois & St. Louis		Charles Rothe	E. St. Louis, Ill.
Indianapolis, Cin. & Lafayette	J. S. Patterson	J. S. Patterson	Cincinnati, O.
Indianapolis, Decatur & Springfield	Pulaski Leeds		Indianapolis, Ind.
Indianapolis, Peru & Chicago	John McKenna	John McKenna	Peru, Ind.
Indianapolis & St. Louis	A. J. Sanborn	A. J. Sanborn	Mattoon, Ill.
Indiana, Bloomington & Western	C. A. Thompson	H. Ford	Urbana, Ill.
International & Great Northern	John G. Conlon	‖W. H. Martin	Palestine, Tex.

Railroad.	*Master-Mechanic.*	*Master Car-Builder.*	*Residence.*
Intercolonial	†H. A. Whitney	Edw. Shaffer	Moncton, N. B.
Iron	Perry Scott	Clem. Roetling	Ironton, O.
J			
Jacksonville, Pensacola & Mobile	Jas. D. Hollister		Tallahassee, Fla.
Jeffersonville, Mad. & Indianapolis	Wm. Swanston	‖J. D. McIlwain	Jeffersonville, Ind.
Jacksonville, N. West. & S. East	B. J. Miller		Jacksonville, Ill.
Joplin	P. T. Butterly	P. T. Butterly	Girard, Kan.
Junction & Breakwater	J. A. Maguire		Lewes, Del.
K			
Kansas City, Ft. Scott & Gulf	W. D. Rowley		St. Joseph, Mo.
Kansas City, Fort Scott & Gulf	J. S. McCrum	A. N. Montier	Kansas City, Mo.
Kansas City, Lawrence & South'n	J. S. McCrum		Kansas City, Mo.
Kansas City & Eastern	J. H. Burnham	J. H. Burnham	Independence, Mo.
Kan. City, St. Jo. & Coun. Bluff	Wm. D. Rowley	‖Theo. Aylesbury	St. Joseph, Mo.
Kansas Central	Wm. McCall		Leavenworth, Kan.
Kansas Pacific	**John MacKenzie	T. B. Roberts	Armstrong, Kan.
Kaw Valley Division	James Long		Armstrong, Kan.
Smoky Hill Division	John B. Daily		Ellis, Kan.
Denver Division	R. McDougal	‖John Clock	Denver, Col.
Kentucky Central	J. R. Ledyard	J. L. Hackathorn	Covington, Ky.
Knox & Lincoln	E. Bolton	C. L. Turner	Bath, Me.
L			
Lake Erie & Western	¶¶Everett Clemens		Fremont, Ohio.
Lake Erie & Western	¶H. L Cooper		Lafayette, Ind.
Lake Ontario Southern	Geo. Thompson	Wm. Currier	Sodus Point, N. Y.
Lake Shore & Michigan Southern	‡James Sedgley	††John Kirby	Cleveland, Ohio.
Michigan Southern Division	Geo. W. Stevens		Elkhart, Ind.
" " "		Frank O. Bray	Adrian, Mich.
Toledo Division	J. M. Sanborn	W. O. Smith	Norwalk, Ohio.
Erie Division	L. O. Gassett	J. Withyecombe	Cleveland, Ohio.
Buffalo Division	Edward Studley	A. C. Robson	Buffalo, N. Y.
Lehigh Valley	John I. Kinsey		South Easton, Pa.
Lehigh Valley	P. Hofecker		Weatherly, Pa.
Lehigh Valley	John Campbell		Delano, Pa.
Lehigh Valley	D. Clark		Hazleton, Pa.
Lehigh Valley	A. Mitchell		Wilkesbarre, Pa.
Lehigh Valley		E. R. Brown	Mauch Chunk, Pa.
Little Rock & Fort Smith	James Eblin	James Malone	Argenta, Ark.
Little Rock, Miss. River & Texas	Joseph Taylor	Joseph Taylor	Arkans's City, Ark.
Los Angeles & Independence	Jas. Velsir	‖J. S. Young	Los Angeles, Cal.
Louisville, New Albany & Chicago	Geo. Ruhlandt	Geo. Ruhlandt	New Albany Ind.
Long Island	§Thos. Meehan	Hugh Longest	L. Isl'd City, N. Y.
Louisville, Cincinnati & Lexing'n	A. Schaeffer	A. Schaeffer	Louisville, Ky.
Louisville & Nashville	**Reuben Wells		Louisville, Ky.
Nashville & Decatur Div	W. H. Thomas	J. P. Furguson	Nashville, Tenn.
South & North Ala. Div	C. W. White		Birmingham, Ala.
Memphis & Ohio Div	Thos. Walsh		Memphis, Tenn.
Clarksville Division	Wm. Adair		Bowling Green, Ky.
Ev., Hen. & Nashville Div	W. H. Thomas		Nashville, Tenn.
M			
Macon & Brunswick	R. Wagnon	R. Wagnon	Macon, Ga.
Maine Central	J. W. Philbrick	J. W. Philbrick	Waterville, Me.
Maine Central		C. H. Kenison	Augusta, Me.
Manchester & Lawrence	J. T. Gordon	J. T. Gordon	Concord, N. H.
Manhattan Beach	Lewis James		Bay Ridge, L. I.
Manhattan Elevated	T. W. Peeples		New York, N. Y.
Marietta & Cincinnati	E. M. Bosley	E. M. Bosley	Chillicothe, Ohio.
Marquette, Houghton & Onton'gn	‖W. H. Williams	H. D. Lyons	Marquette, Mich.
Memphis, Paducah & Northern	G. M. Taylor	G. M. Taylor	Paducah, Ky.
Memphis & Little Rock	Tho. Rennell	P. Twitchell	Argenta, Ark.
Memphis & Charleston	§H. N. Burford	J. J. Kasey	Memphis, Tenn.
Michigan Central	S. H. Edgerly		Jackson, Mich.
Michigan Central		††Robert Miller	Detroit, Mich.
Midland of New Jersey	W. C Ennis		Wortendyke, N. J.
Milwaukee, Lake Shore & West'n	S. Charnly		Manitowoc, Wis.
Minneapolis & St. Louis	Tho. Downing	Tho. Downing	Minneapolis, Minn.
Mineral Point	Robert Hay	Robert Hay	Mineral Pt., Wis.
Mineral Range	George F. Coon		Hancock, Mich.
Mississippi & Tennessee	Geo. Haszinger	S. J. Bolton	Memphis, Tenn.
Missouri & Western	A. C. Persing		Pierce City, Mo
Missouri, Iowa & Nebraska	J. G. Crozier		Alexandria, Mo.
Missouri, Kansas & Texas	H. H. Alexander		Dennison, Texas.
Missouri, Kansas & Texas	**G. W. Cushing	John C. Barber	Sedalia, Mo.
Missouri, Kansas & Texas	Wm. T. Small		Parsons, Kan.
Missouri Pacific	§§John Hewitt	John Hodge	St. Louis, Mo.
Missouri Pacific	R. D. Grant		St. Louis, Mo.
Missouri Pacific	Geo. W. Walshe		Sedalia, Mo.
Missouri Pacific	H. V. Faries		Atchison, Kan.
Mobile & Montgomery	C. W. White	Lewis Barham	Montgomery, Ala.
Mobile & Girard	J. C Albrecht	A. J. Nix	Columbus, Ga.
Mobile & Ohio	R. H. Briggs	J. T. Booth	Whistler, Ala.
Mobile & Ohio	John Fitzgerald		Macon, Miss.
Mobile & Ohio	M. T. Carson		Jackson, Tenn.
Montgomery & Eufaula	D. M. Gugel	James A. Knight	Macon, Ga.
Morgan's Louisiana & Texas	N. Tilton	Wm. O'Brien	Algiers, La.
N			
Nashua & Lowell	S. A. Davis	S. A. Davis	Nashua, N. H.
Nashville, Chattan'ga & St. Louis	James Cullen	J. G. Sawyer	Nashville, Tenn.
St. Louis Division	L. B. Salisbury	W. H. H. Price	Mt. Vernon, Ill.
Naugatuck	Henry Hanford	George W. Gray	Bridgeport, Ct.
Nebraska	D. Hawksworth		Plattsmouth, Neb.
Nevada Central	J. C. Fisher		Battle Mountain, Nev.
Newburg, Dutchess & Connecticut	W. G. Vanbuskirk		Dutchess J'n, N. Y.
New Brunswick	P. A. Logan	P. A. Logan	Fredericton, N. B.
New Brunswick & Canada	Tho. Armstrong	G. Houlton	St. Andrew's, N. B.
New Haven & Northampton	Henry Fox	John Sweeny	New Haven, Ct.
New Jersey & New York	J. S. Drake		Jersey City, N. J.
New Jersey Southern	Rufus Blodgett		Manchester, N. J.
New Orleans, Texas & Mobile	§Josiah Bettis		Mobile, Ala.
New York, Lake Erie & Western	§§F. M. Wilder		Susquehanna, Pa.
New York, Lake Erie & Western	J. H. Vreeland		Jersey City, N. J.
New York, Lake Erie & Western		‖J. N. Mileham	Jersey City, N. J.
New York, Lake Erie & Western	J. Van Vechten	‖J. Van Vechten	Port Jervis, N. Y.
New York, Lake Erie & Western	V. Blackburn		Susquehanna, Pa.
New York, Lake Erie & Western		‖D. B Goodell	Elmira, N. Y.
New York, Lake Erie & Western	George H. Griggs		Hornellsville, N. Y.
New York, Lake Erie & Western	Chas. O. Vedder	‖M. Wilder	E. Buffalo, N. Y.
New York, Lake Erie & Western	‖Jos. Bradt		Rochester, N. Y.
New York & Harlem	Theo. Wheeler		New York, N. Y.
New York & Harlem		C. E. Garey	Morrisania, N. Y.
New York Central & Hud. River		††Leander Garey	New York, N. Y.
New York Central Division	§§G. B. Van Vorst	D. Hoit	West Albany, N. Y.
New York Central Division	§§Henry Watkeys		Syracuse, N. Y.
New York Central Division	§§Amos Gould		E. Buffalo, N. Y.
New York Central Division	§§S. L. White	Richard Donaby	Niagara Falls, N. Y.
New York Central Division		E. A. Olmstead	E. Buffalo, N. Y.
Hudson River Division	§§Wm. Buchanan	Peter Smith	New York, N. Y.
New York Central Division		W. B. White	E. Rochester, N. Y
New York Central Division		Geo. Cummings	Rochester, N. Y.
New York, Ontario & Western	Edw. Minshull		Middletown, N. Y.
New York & New England	§§Geo. E. Boyden	Elias E. Pratt	Boston, Mass.
Norwich & Worcester Div	Richard Colburn	John W. Marden	Norwich, Ct.
Hartford Division	E. M. Humstone		Hartford, Conn.
New York, N. Haven & Hartford	§§H. Kettendorf	James Denver	New Haven, Ct.
Hartford Division	§§Jno. Henney, Jr.	L. Packard	Hartford, Ct.
New York, Penn. & Ohio	‡William Fuller	††J. H. F. Wiers	Cleveland, O.
New York, Penn. & Ohio	J. A. Cooper	D. S. Dockstader	Meadville, Pa.
New York, Penn. & Ohio	N. Wright	W. G. Huggard	Cleveland, O.
New York, Penn. & Ohio		S. V. Smith	Kent, O.
New York, Penn. & Ohio	William Hill	J. W. Holmes	Galion, O.
New York, Penn. & Ohio		‖J. T. Fosdick	Salamanca, N. Y
New York, Penn. & Ohio		‖Geo. Wilson	Dayton, O.
Northern Central	§§R. H. Soule	‖G. W. Demarest	Baltimore, Md.
Northern Central	J. M. Coale		Baltimore, Md.
Northern Central	James Strode	‖J. C. Dyott	Elmira, N. Y.
Northern New Hampshire	**Jas. N. Lauder		Concord, N. H.
Northern of Canada	Peter Clark	Peter Clark	Toronto, Can.
Northern Pacific	**A. P. Farrar	A. P. Farrar	Brainerd, Minn.
Dakota Division	A. Rupert		Fargo, Dak.
Pacific & P. Oreille Div	C. Z. Sanders	Tho. G. Davis	New Tacoma, W. T.
Northeastern		W. H. Day	Florence, S. C.
North Pacific Coast	James Walch		Saucelito, Cal.
O			
Ogdensburg & Lake Champlain	Abraham Klohs		Malone, N. Y.
Ohio Central	J. B. Morgan		Columbus, O.
Ohio & Mississippi	‡J. F. Sechler		Vincennes, Ind.
Ohio & Mississippi		J. P. Coulter	Aurora, Ind.
Cincinnati Division	John Thumser		Seymour, Ind.
Springfield Division	E. K. Sechler		Pana, Ill.
Old Colony	J. K. Taylor	A. Gleason	Boston, Mass.
B. C. F. & N. Bedford Div	Geo. W. Reynolds	Sam. Stevens	Taunton, Mass.
Oregon & California	§§J. Brandt		Portland, Oregon.
Oregon Railway & Navigation Co	J. F Curtis	Chas. Phipps	Dalles, Oregon.
P			
Paducah & Elizabethtown	W. D. Robb	W. D. Robb	Elizabethtown, Ky.
Painesville & Youngstown	J. H. Jones		Painesville, O.
Panama	Thos. S. O'Brien		Aspinwall, U. S. C.
Parker & Karns City	Philip Davies	Wm. Wolford	Parker City, Pa.
Pensacola & Selma	R. H. Kelly		Selma, Ala.
Pennsylvania	§§T. N. Ely		Altoona, Pa.
Pennsylvania	H. D. Garrett	I. W. Van Houten	W. Philadelphia, Pa
Pennsylvania	E. L. Caum	Samuel W. Myers	Harrisburg, Pa.
Pennsylvania	G. W. Strattan	John P. Levan	Altoona, Pa.
Pennsylvania	D. O. Shaver	J. G. Stewart	Pittsburg, Pa.
New Jersey Division	L. A. Bosdevex	E. F. Bosdevex	MeadowShops, N. J.
New Jersey Division		David H. Baker	Jersey City, N. J.
New Jersey Division	§§H. S. Hayward		Jersey City, N. J.
New Jersey Division	Tho. Kerr	P. S. Bogart	So. Amboy, N. J.
New Jersey Division	R. McDowell		Lambertville, N. J
New Jersey Division	W. McAllister		Camden, N. J.
West Penn. Division	C. B. Street	M. H. Fails	Blairsville, Pa.
Peoria, Decatur & Evansville	Isaac Adams		Pekin, Ill.
Peoria & Jacksonville	R. F. Hurd	R. F. Hurd	Pekin, Ill.
Peoria & Springfield	E. Deizerdt	E. Deizerdt	Peoria, Ill.
Petersburg	R. B. Andrews	J. W. Fleming	Petersburg, Va.
Philadelphia, Wilmington & Balt	S. A. Hodgman	Wm. Lungren	Wilmington, Del
Philadelphia & Atlantic City	J. W. Wright	E. Lippincott	Camden, N. J.
Philadelphia & Erie	§§Howard Fry		Williamsport, Pa.
	W. F. Beardsley		Sunbury, Pa.
	W. L. Forster		Renovo, Pa.
	W. L. Holman		Kane, Pa.
	W. T. Smith		Erie, Pa.
Philadelphia & Baltimore Central	S. D. Danfield	S. D. Danfield	Chester, Pa.
Philadelphia & Reading	*L. B. Paxson	John H. Rankin	Reading, Pa.
Catawissa Branch	W. H. Ellis	C. D. Ellis	Catawissa, Pa.
Germantown & Norris'n Div	Jackson Richards		Philadelphia, Pa.
North Penn. Division	Jackson Richards	C. W. Hammann	Philadelphia, Pa.
Del. & Bound Brook Div	Jackson Richards		Philadelphia, Pa.
Southeastern (Canada)	Edwin Goss		Richford, Vt
Piedmont Air Line	‡R. D. Wade		Richmond, Va.
Rich. & Danville Div		J. B. Vaughan	Richmond, Va.
North Carolina Div		J. C. Holt	Comp. Shops, N. C.
Pittsburg, Cincinnati & St. Louis	§§G. W. Rhodes		Columbus, O.
Little Miami Division	J. H. Setchel	John McVay	Cincinnati, O.
Little Miami Division		M. P. Ford	Columbus, O.
Col., Cin. & Ind. Division	Robert Curtis	‖Tho. Chamberlin	Columbus, O.
Col., Cin. & Ind. Div	Geo. H. Prescott	‖Chas. H. Starr	Logansport, Ind.
Col. Cin. & Ind. Division	‖C. M. St. Clair		Indianapolis, Ind.
Cin. & Musk. Val. Division	Leroy Kells	‖Daniel Jewell	Lancaster, O
Pitts. Cin. & St. Louis Divis'n	Ross Kells		Denison, O.
Pitts. Cin. & St. Douis Divis'n		‖A. K. Mansfield	Steubenvill, O.
Pittsburg, Fort Wayne & Chicago	Geo. J. Parkin	John Marquis	Allegheny, Pa.
Pittsburg, Fort Wayne & Chicago	J. M. Boon	Israel Lee	Fort Wayne, Ind
Pittsburg, Fort Wayne & Chicago		J. J. Kirkland	Crestline, O.
Pittsburg, Titusville & Buffalo	H. J. Bookhammer	John Monks	Oil City, Pa.
Pittsburg, Virginia & Charleston	Wm. Lininger		Pittsburg, Pa.
Pittsburg & Lake Erie	S. W. Haines		Pittsburg, Pa.
Portland & Ogdensburg	Geo. H. Poor	W. G. Brewer	Portland, Me.
Portland & Rochester	E. H. C. Tompson	David Dow	Portland, Me.
Port Dover & Lake Huron	H. M. Aldrich		Woodstock, Ont.
Port Royal & Augusta	Geo. Riley	J. H. Milton	Port Royal, S. C.
Poughkeepsie, Hartford & Boston	John L. Driscoll		Poughkeepsie, N. Y
Prince Edward Island	A. Stronach	‖D. M. Fraser	Charlottet'n, P. E. I
Providence & Springfield	G. T. Richardson		Pascoag, R. I.
Providence & Worcester	A. Griggs	A. Griggs	Providence, R. I.
Providence, Warren & Bristol	Rufus Smith	J. Brightman	Bristol, R. I.
Q			
Quebec, Mont., Ottawa & Occidental	†A. Davis		Montreal, Can.
Quincy, Missouri & Pacific			Kirksville, Me.
R			
Raleigh & Augusta Air-Line	**B. R. Harding		Raleigh, N. C.
Raleigh & Gaston	**B. R. Harding	B. R. Harding	Raleigh, N. C.
Rhinebeck & Connecticut	A. W. Quackenbush	John H. Decker	Rondout, N. Y.
Rich., Fredericksburg & Potomac	H. Khun	W. H. Trainham	Richmond, Va.
Richmond & Danville	See Piedmont Air-Line.		
Richmond & Petersburg	John O'Brien	H. L. Carter	Richmond, Va.
Rich., York River & Chesapeake	A. B. Armstrong	A. B. Armstrong	Richmond, Va.
Rio Grande	G. W. Rendall	M. Markwood	Brownsville, Tex.
Rochester & State Line	A. J. Robbins		Rochester, N. Y.
Rock Island & Peoria	Joseph Elder		Peoria, Ill.
Rome, Watertown & Ogdensburg	Geo. H. Hazleleton	Geo. H. Hazelton	Oswego, N. Y.
Rome, Georgia	O. W. Harbin	O. W. Harbin	Rome, Ga.
S			
Saginaw Valley & St. Louis			St. Louis, Mich.
San Francisco & Northern Pacific	Ed. Reynolds	H. C. Whiting	Donahue, Cal.
Savannah, Florida & Western	§Charles Collins	P. N. Raynall	Savannah, Ga.
Savannah & Memphis	R. A. Bridges		Opelika, Ala.
Scioto Valley	C. H. Cory	C. H. Cory	Portsmouth, O.
Seaboard & Roanoke	§§M. M. Pendleton		Portsmouth, Va.
Selma, Rome & Dalton	B. J. Sitton	W. W. Pierce	Selma, Ala.
Selma, Marion & Memphis	J. M. Levis		Marion, Ala.
Sheboygan & Fond du Lac	John Hickey	John Hickey	Sheboygan, Wis.
Shenango & Allegheny	Edw. Richardson		Greenville, Pa.
Shepaug	C. M. Allen		Litchfield, Ct.
Sioux City & Pacific	C. H. Foster	C. H. Foster	Missouri Valley, Ia.
Sioux City & St. Paul	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Southern Pacific.			
Northern Division	J. T. Wilson	F. N. Bellisle	San Francisco, Ca
Los Angeles & Yuma Div	Jas. Velsir	‖J. S. Young	Los Angeles, Cal.
Tulare Division	S. Johnson		Tulare, Cal.
South Carolina	§P. J. Cochrane	Geo. H. Gramling	Charleston, S. C.
Southern Central	Chas. G. Brown	H. Mooney	Auburn, N. Y.
Southwestern of Georgia	D. M. Gugel	James A. Knight	Macon, Ga.
South Pacific Coast	Martin Carter	Martin Carter	Newark, Cal.

Railroad.	*Master Mechanic.*	*Master Car Builder.*	*Residence.*
Spartanburg, Union & Columbia	Wm. Platt	W. B. Brown	Spartanburg, S. C.
Spartanburg & Asheville	M. Fraser	W. B. Brown	Spartanburg, S. C.
Springfield, Athol & Northeastern	W. E. Granger		Springfield, Mass.
Springfield Southern	F. W. Johnstone		Springfield, O.
State Line & Sullivan	J. O. Blight		Towanda, Pa.
Stockton & Copperopolis	John M. Fulton		Stockton, Cal.
Stonington & Providence	J. H. Anderson	J. H. Anderson	Providence, R. I.
St. Croix & Penobscot	G. H. Corsen	H. C. Tincker	Milltown, Me.
St. Johns	Jas. M. Owens		St. Augustine, Fla.
St. Johnsbury & Lake Champlain	Geo. E. Howe		St. Johnsbury, Vt.
S. Joseph & Des Moines	W. D. Rowley		St. Joseph, Mo.
St. Joseph & Western	E. Sleppy	E. Sleppy	So. St. Joseph, Mo
St. Lawrence & Ottawa	Calvin Dame	Calvin Dame	Prescott, Canada.
St. Louis, Iron Mount. & So	**O. A. Haynes	Oscar Doolittle	St. Louis, Mo.
Arkansas Division	L. Finlay	L. Finlay	Little Rock, Ark.
Missouri Division	W. H. Harris		De Soto, Mo.
St. Louis, Alton & Terre Haute	**Beriah Warren.		St. Louis, Mo.
St. Louis, Salem & Little Rock	Thomas Everson	A. W. Grosvernor	Steelville, Mo.
St. Louis & San Francisco	M. Kearney		N. Springfield, Mo.
St. Louis, Keokuk & Northwest'n	Wm. Foley		Keokuk, Iowa.
St. Paul & Duluth	W. McFarland	John Hill	St. Paul, Minn.
St. Paul, Minneapolis & Manitoba	J. C. Munro	J. C. Munro	St. Paul, Minn.
St. Paul & Sioux City	F. C. Butterfield	F. C. Butterfield	Shakopee, Minn.
Sussex	E. H. Osborn.	R. L. Sutton	Newton, N. J
Syracuse, Binghamton & N. Y	James Buchanan	James Buchanan	Syracuse, N. Y.
Syracuse, Chenango & New York	Geo. W. West		Syracuse, N. Y.
T			
Tennessee & Pacific	William McKeand	William McKeand	Nashville, Tenn.
T. H. & Indianapolis. Vandalia Line.	§§C. R. Peddle	E. D. Carter	Terre Haute, Ind.
Indianapolis Div.	Clinton Idler		Indianapolis, Ind
Vandalia Div.	Chas. Butler		Effingham, Ill.
Logansport Division	A. J. Prescott	H. L. Clark	Logansport, Ind.
Texas & New Orleans	E. A. Campbell		Houston, Texas.
Texas & Pacific	H. J. Small	F. M. Alexander	Marshall, Texas.
Tioga & Elmira State Line	Pere Bonny	D. H. Stratton	Blossburg, Pa.
Toledo, Delphos & Burlington	Geo. H. Tier		Delphos, O.
Toledo, Peoria & Western	W. O. Hewitt	R. M. Hemphill	Peoria, Ill.
Toronto, Grey & Bruce	†David Preston		Toronto, Can.
Toronto & Nipissing	J. Haggas		Toronto, Can.
Troy & Boston	Z. B. Davis	R. V. Coon	Troy, N. Y.
Ulster & Delaware	J. B. Dykeman	Jno. H. Decker	Rondout, N. Y.
U			
Union Pacific	§I. H. Congdon	‡‡Geo. E. Stevens	Omaha, Neb.
Eastern Division		A. M. Collett	Omaha, Neb.
Eastern Division		H. P. Makely	Grand Island, Neb.
Mountain Division	T. A. Davis	John E. Davis	Cheyenne, Wg. T.
Laramie Division		Floyd Heavaner	Laramie, Wg. T.
Western Division		R. V. Brinkley	Evanston, Wg. T.
Colorado Division	James S. Scott	E. G. Thomas	Golden, Col.
Union Railway & Transit Co	H. M. Smith		St. Louis, Mo.
Utah Central	W. B. Armstrong	Sam. S. Tucker	Salt Lake City.
Utah Western	Robert Anderson		Salt Lake City, U.
Utica & Black River	John Bailey	David James	Utica, N. Y.
Utica, Ithaca & Elmira	Geo. W. Cleveland	F. W. Magargil	Breesport, N. Y.
V			
Valley	Wm. Spittle	Wm. Spittle	Cleveland, O.
Vicksburg & Meridian	Jas. B. Browne		Vicksburg, Miss.
Vicksburg, Shreveport & Pacific	C. H. Tull		Monroe, La.
Virginia & Truckee	I. N. Fording		Carson, Nev.
W			
Wabash, St. Louis & Pacific	Chauncy Morris		Fort Wayne, Ind.
Wabash, St. Louis & Pacific	Jacob Johann	B. B. Rose	Springfield, Ill.
Wabash, St. Louis & Pacific		U. H. Kohler	Toledo, Ohio.
Wallkill Valley	A. W. Quackenbush	Jno. H. Decker	Rondout, N. Y.
Wash. City, Va. Mid. & G. South	Jas. E. Waddey	J. T. Nalls	Alexandria, Va.
Washington & Ohio	Edward Dunn	John Harrison	Alexandria, Va.
Welland	James Taylor	Wm. H. Pay	St. Catharine, C. W.
Westchester & Philadelphia	John Moyer	Nathan Pawling	Philadelphia, Pa.
Western & Atlantic	John H. Flynn	W. G. Grambling	Atlanta, Ga.
Western Maryland	§David Holtz	J. H. Nussear	Union Bridge, Md.
Western North Carolina	Geo. W. Gates		Salisbury, N. C.
Western, of Alabama	Robert King	F. M. Wade	Montgomery, Ala.
Western R. R. N. C	Isaac W. Clark	Isaac W. Clark	Fayetteville, N. C
Western Union	John Taylor	E. A. Eddy	Racine, Wis.
West Feliciana	J. A. Tilton	Wm. McKelvey	Laurel Hill, La.
West Jersey	W. McAllister	C. C. Williams	Camden, N. J.
White Water	§L. W. Wingert		Harrison, O.
Wilmington, Columbia & Augusta	John Bisset	W. H. Day	Florence, S. C.
Wilmington & Weldon	John Bisset	C. R. Clowe	Wilmington, N. C.
Wisconsin Central	G. Campbell	J. L. Adam	Stevens' P't, Wis.
Worcester & Nashua	John G. Brady	John G. Brady	Worcester, Mass.

Directory of Railway Superintendents and Purchasing Agents

THROUGHOUT THE UNITED STATES AND CANADA.

REFERENCES.—* General Manager. † Managing Director. ‡ Assistant General Superintendent. § Assistant Superintendent. ** Superintendent of Transportation. §§ Assistant General Manager.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
A			
Adirondack	C. E. Durkee		Saratoga, N. Y.
Alabama Central	John M. Bridges		Selma, Ala.
Alabama Great Southern	Chas. P. Ball	R. W. Healey	Chattanooga, Tenn.
Albany & Susquehanna	*C. F. Young		Honesdale, Pa.
Alleghany Valley	David McCargo	David McCargo	Pittsburg, Pa.
Anderson, Lebanon & St Louis	Jas. A. Larnerd		Anderson, Ind.
Arkansas Midland	*A. H. Johnson		Helena, Ark.
Ashtabula & Pittsburg	D. B. McCoy		Ashtabula, O.
Atchison, Topeka & Santa Fe	*W. B. Strong	F. M. Smith	Topeka, Kan.
Western Division	W. W. Borst		Nickerson, Kan.
Eastern Division	D. J. Chase		Topeka, Kan.
Atchison & Nebraska	*A. E. Touzalin		Omaha, Neb.
Atlanta & Charlotte Air Line	*G. J. Foreacre	G. J. Foreacre	Atlanta, Ga.
Atlanta & West Point	L. P. Grant		Atlanta, Ga.
Atlantic & North Carolina	A. B. Andrews		Newbern, N. C.
Atlantic, Mississippi & Ohio	Geo. Hoffman	J. P. Minetree	Petersburg, Va.
Atlantic, Tennessee & Ohio	J. J. Gormley		Charlotte, N. C.
B			
Baltimore & Ohio	**W. M. Clements	N. S. Hill.	Baltimore, Md.
Ohio & Chicago Division	C. H. Hudson		Chicago, Ill.
Pittsburg Division	G. M. Serpell		Connellsville, Pa.
Baltimore & Potomac	Geo. C. Wilkins	A. W. Sumner	Baltimore, Md.
Bangor & Piscataquis	Arthur Brown		Bangor, Me.
Bath & Hammondsport	M. H. Hall		Hamm'dsp't, N. Y.
Bedford, Sp'gville, Owensb'g & Bd.	Jas. W. Kennedy	Jas. W. Kennedy	Bedford, Ind.
Bellefonte & Snow Shoe	Daniel Rhoads		Bellefonte, Pa.
Bell's Gap	Robert G. Ford		Bellwood, Pa.
Bennington & Rutland	F. C. White	F. C. White	Rutland, Vt.
Blairstown	J. D. Vail		Blairstown, N. J.
Boston, Revere Beach & Lynn	E. H. Whorf		Boston, Mass.
Boston & Albany	*Wm. Bliss		Boston, Mass.
Boston & Albany	C. O. Russell		Springfield, Mass.
Boston & New York Air Line	Jos. H. Franklin		New Haven, Conn.
Boston & Providence	A. A. Folsom	A. A. Folsom	Boston, Mass.
Boston Concord & Montreal	*J. A. Dodge		Plymouth, N. H.
Boston, Concord & Montreal	§W. A. Stowell	J. Thomas Vose	Boston, Mass.
Boston, Hoosac Tunnel & Western	E. B. Burnham		N. Adams, Mass.
Boston & Maine	J. T. Furber	M. E. Wood	Boston, Mass.
Boston & Lowell	A. A. Hobart	F. H. Nourse	Boston, Mass.
Boston, Barre & Gardner	H. M. Witter	H. M. Witter	Worcester, Mass.
Brooklyn, Flatbush & Coney Isl'd.	W. E. Dorwin		Brooklyn, N. Y.
Brunswick & Albany	R. D. Meader		Brunswick, Ga.
Burlington & Mo. River (in Neb.)	*A. E. Touzalin	G. Hargreaves	Omaha, Neb.
Burlington & Mo. River (in Neb.)	Geo. W. Holdrege		Lincoln, Neb.
First Division	J. O. Phillipi		Lincoln, Neb.
Burlington, Cedar Rapids & Nor'n.	C. J. Ives	Rob't Williams	Cedar Rapids, Ia.
Burlington & Northwestern	John F. Gerry	John F. Gerry	Burlington, Ia.
Burlington & Southwestern	J. W. Smith	J. W. Smith	Burlington, Ia.
Buffalo & Southwestern	*John F. Moulton		Buffalo, N. Y.
Buffalo, New York & Philadelphia	Geo. S. Gatchell	J. H. Pool	Buffalo, N. Y.
C			
Cairo & St. Louis	*L. M. Johnson	L. M. Johnson	St. Louis, Mo.
Cairo & Vincennes	Roswell Miller	T. W. Fitch	Cairo, Ill.
California Pacific & Northern	§J. A. Fillmore		Sacramento, Cal.
Camden & Atlantic	F. A. Lister	F. A. Lister	Camden, N. J.
Canada Central	T. A. McKinnon		Brockville, Can.
Canada Southern	*Wm. P. Taylor	A. F. Howland	St. Thomas, Ont.
U. S. Division	E. P. Murray		Toledo, O.
Canada Division	W. E. Carroll		St. Thomas, Ont.
Canadian Pacific	J. F. Lynskey		Winnepeg, Man.
Carbondale & Shawneetown	R. J. Cavett		Carbondale, Ill.
Carolina Central	V. Q. Johnson	C. H. Roberts	Wilmington, N. C.
Catasauqua & Fogelsville	C. W. Chapman	C. W. Chapman	Catasauqua, Pa.
Cayuga Southern	W. Stevenson		Sayre, Pa.
Cayuga & Susquehanna	W. R. Humphreys		Ithaca, N. Y.
Cazenovia, Canastota & De Ruyter	John Stebbins		Cazenovia, N. Y.
Central Pacific	*A. N. Towne		San Francisco, Cal.
Central Pacific	J. A. Fillmore		San Francisco, Cal.
Central Pacific		J. R. Watson	Sacramento, Cal.
Western & Visalia Divisions	A. D. Wilder		Oakland, Cal.
Truckee Division	Frank Free		Wadsworth, Nev.
Humboldt Division	G. W. Coddington		Carlin, Nev.
Salt Lake Division	A. G. Fell		Ogden, Utah.
Sacramento & Oregon Div	R. H. Pratt		Sacramento, Cal.
Central Vermont	J. W. Hobart		St. Albans, Vt.
Central Vermont	‡J. M. Foss		St. Albans, Vt.
Western Division	John Schrier		Ogdensburg, N. Y.
Central & Southern Division			St. Albans, Vt.
Rutland Division	J. Burdett		Rutland, Vt.
New London Northern	G. W. Bentley	G. W. Bentley	New London, Conn.
Central of Georgia	Wm. Rogers	Henry Yonge	Savannah, Ga.
Atlanta Division	W. F. Shellman		Macon, Ga.
Central of Iowa	D. N. Pickering	D. N. Pickering	Marshalltown, Ia.
Central of New Jersey	James Moore	B. W. Burnet	Elizabeth, N. J.
Central Division	W. W. Stearns		Elizabeth, N. J.
Lehigh & Susq. Division	W. S. Polhemus		Mauch Chunk, Pa.
Champaign, Havana & Western	A. H. Wood		Urbana, Ill.
Charleston & Savannah	C. S. Gadsden		Charleston, S. C.
Charlotte, Columbia & Augusta	Jno. G. Clarke		Columbia, S. C.
Chesapeake & Ohio	W. M. S. Dunn	J. A. Netherland	Richmond, Va.
Cheraw & Darlington	J. F. Divine		Society Hill, S. C.
Cherokee	John Postell		Atlanta, Ga.
Cheshire	R. Stewart	H. H. Stone	Keene, N. H.
Chester & Lenoir	James Mason		Chester, S. C.
Chicago & Northwestern	*Marvin Hughitt	R. W. Hamer	Chicago, Ill.
Chicago & Northwestern	J. S. Oliver		Chicago, Ill.
Chicago & Northwestern	§Chas. C. Wheeler		Chicago, Ill.
Wisconsin & Mill. Division	E. J. Cuyler		Chicago, Ill.
Peninsula Division	W. B. Lindsay		Escanaba, Mich
Madison Division	C. A. Swineford		Baraboo, Wis.
Galena Division	Chas. Murray		Chicago, Ill.
Des Moines & Iowa Division	J. M. Whitman		Clinton, Iowa.
Winona & St. Peter Division	S. Sanborn		Winona, Minn.
Galena & Wisconsin Br	J. B. Trull		Galena, Ill.
Chicago & Alton	J. C. McMullen	A. V. Hartwell	Chicago, Ill.
Chicago & Alton	‡C. H. Chappell		Bloomington, Ill.
Chicago Division	A. M. Richards		Chicago, Ill.
Kansas City St. Louis Div			Mexico, Mo.
Chicago & Block Coal	*A. F. Beach		Veedersburg, Ind.
Chicago, Burlington & Quincy	*Thos. J. Potter	Wm. Irving	Chicago, Ill.
Chicago, Burlington & Quincy	§John D. Besler		Galesburg, Ill.
Chicago, Burlington & Quincy	§E. Ryder		Chicago, Ill.
Middle, Galesb'g & Q'y Div	H. Hitchcock		Galesburg, Ill.
St. Louis & R. Isl'd Division	W. R. Crumpton		St. Louis, Mo.
Iowa Division	W. C. Perkins		Burlington, Iowa.
Chi., Clinton, Dubuque & Minn	*F. O. Wyatt	F. O. Wyatt	Dubuque, Iowa.
Chicago & Eastern Illinois	O. S. Lyford	O. S. Lyford	Chicago, Ill.
Chicago & Iowa	W. H. Holcomb, *Rec*		Rochelle, Ill.
Chicago & Northeastern	J. M. Turner		Lansing, Mich.
Chicago & Pacific	*J. M. Whitman	James Penny	Chicago, Ill.
Chicago & Paducah	D. H. Conklin		Streator, Ill.
Chicago & Paducah		C. L. Rising	Chicago, Ill.
Chicago, St. Louis & New Orleans	*J. C. Clarke	J. C. Febiger, Jr	New Orleans, La.
South Division	W. P. McKinley		McComb City, Miss.
North Division	J. G. Mann		Jackson, Tenn.
Chicago, Rock Island & Pacific	A. Kimball		Davenport, Iowa.
Chicago, Rock Island & Pacific	‡A. Manvel	A. Manvel	Chicago, Ill.
Southwestern Division	G. F. Walker		Trenton, Mo.
Iowa Division	H. F. Royce		Des Moines, Iowa
Keokuk & Des Moines Div	John Givin		Keokuk, Ia.
Chicago & West Michigan	§C. M. Lawler		St. Joseph, Mich.
Chicago, Milwaukee & St. Paul	W. C. Van Horne	J. T. Crocker	Milwaukee, Wis.
Ch., LaCrosse & P. du C. Div.	H. C. Atkins		Milwaukee, Wis.
Northern Division	L. B. Rock		Milwaukee, Wis.
I. & M., & I. D. Division	C. H. Prior		Minneapolis, Minn.
Wabasha Division	J. H. Lakey		Wabasha, Minn
Western Union Division	D. A. Olin		Racine, Wis.
Sioux City & Dak. Div	G. E. Merchant		Sioux City, Ia.
Southern Minnesota Div	J. M. Egan	J. M. Egan	La Crosse, Wis
Chicago, Pekin & Southwestern	J. Murray	C. L. Rising	Chicago, Ill.
Chicago, St. Paul & Minneapolis	E. W. Winter		St. Paul, Minn.
Chicago & Grand Trunk	Henry Funnell		Battle Creek, Mich.
Chicago & Grand Trunk		N. Wall	Port Huron, Mich.
Chippewa Falls & Western	L. C. Stanley		Chip'wa F'lls, Wis.
Cincinnati & Eastern	George H. Wilber		Batavia, O.
Cincinnati, Wabash & Michigan	*Norman Beckley	Norman Beckley	Elkhart, Ind.
Cincinnati, Richmond & Chicago	*Lewis Williams		Cincinnati, O.
Cincinnati, Rockp't & Southwest'n.	H. C. Branham	H. C. Branham	Rockport, Ind.
Cincinnati & Terre Haute	John Holland		Terre Haute, Ind.
Cin., Cumber'd Gap & Charleston	W. J. Taylor		Knoxville, Tenn.
Cincinnati, Hamilton & Dayton	*Lewis Williams	Lewis Williams	Cincinnati, O.
Cin., Hamilton & Indianapolis	Lewis Williams		Cincinnati, O.
Cincinnati, Lafayette & Chicago	J. W. Sherwood		Cincinnati, Ohio.
Cin., Sandusky & Cleveland	*D. W. C. Brown	Frank Herriman	Sandusky, O.
Cincinnati Southern	Sam'l Woodward	C. M. Woodward	Cincinnati, O.
Cin., Indianapolis, St. Louis & Chi	J. W. Sherwood		Indianapolis, Ind
Cin., Indianapolis, St. Louis & Chi		George Tozzer	Cincinnati, O.
Cleve., Col., Cin. & Indianapolis	*E. B. Thomas	J. L. Yale	Cleveland, O.
Indianapolis Division	C. C. Gale		Indianapolis, Ind
Col. and Cincinnati Divs	Robert Blee		Cleveland, O.
Cleveland & Marietta	S. C. Baldwin	R. B. Hoover	Marietta, Ohio.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Cleveland & Pittsburg	John Thomas		Cleveland, O.
Cleveland & Pittsburg	*J. D. Layng	Wm. Mullins	Pittsburg, Pa.
Cleveland, Mt. Vernon & Columb's	G. A. Jones		Mt. Vernon, O.
Cleve., Tuscarawas Val. & Wheel	*Oscar Townsend		Cleveland, O.
Cobourg, Petersboro & Marmora	James R. Barber	J. R. Barber	Cobourg, Ont.
Columbus & Hocking Valley	Orland Smith		Columbus, O.
Columbus & Toledo	Orland Smith	Geo. R. Carr	Columbus, O.
Columbus & Rome	T. J. Nuckolls		Columbus, Ga.
Concord & Claremont	George E. Todd		Concord, N. H.
Concord	H. E. Chamberlin	H. E. Chamberlin	Concord, N. H.
Concord & Portsmouth	H. E. Chamberlin		Concord, N. H.
Connecticut Central	D. D. Warren, Pres		Springfield, Mass.
Connecticut River	John Mulligan	John Mulligan	Springfield, Mass.
Connecticut Valley	Samuel Babcock		Hartford, Conn.
Connecticut Western	J. F. Jones		Hartford, Conn.
Connecticut & Passumpsic Rivers	H. E. Folsom		Lyndonville, Vt.
Corning, Cowanesque & Antrim	A. H. Gorton		Corning, N. Y.
Covington, Col. & Black Hills	J. I. Booge		Sioux City, Iowa.
Cumberland Valley	J. F. Boyd	O. N. Lull	Chambersburg, Pa.
Cumberland & Pennsylvania	P. L. Burwell	P. L. Burwell	Cumberland, Md.
Cumberland & Maurice River	L. H. Dowdney		Port Norris, N. J.
D			
Danbury & Norwalk	L. W. Sandiforth		South Norwalk, C.
Danville & Southwestern	James A. Eads		Paris, Ill.
Davenport & Northwestern	D. Flanigan		Davenport, Ill.
Dayton & Michigan	J. H. Weller		Dayton, O.
Dayton & Union	C. C. Gale		Indianapolis, Ind.
Dayton & Southeastern	J. E. Gimperling, *Rec.*	E. F. Pryor	Dayton, O.
Delaware & Chesapeake	O. S. Sanford		Easton, Md.
Delaware & Hudson Canal Co.	R. Manville	J. White Sprong	Albany, N. Y.
Delaware & Hudson Canal Co.	*C. F. Young		Honesdale, Pa.
Albany & Susq. Division	C. D. Hammond		Albany, N. Y.
Rensselaer & Saratoga Div.	Theo. Voorhees		Troy, N. Y.
Delaware, Lackawanna & Western		G. W. B. Cushing	New York City.
Delaware, Lackawanna & Western	W. F. Hallstead		Scranton, Pa.
Bloomsburg Division	G. Bogart		Scranton, Pa.
Morris & Essex Division	Andrew Reasoner		Hoboken, N. J.
Oswego & Syracuse Division	W. B. Phelps		Oswego, N. Y.
Utica, Chenango & Sus. Div.	W. G. Oakman		Scranton, Pa.
Delaware Western	David Connell		Wilmington, Del.
Denver & Rio Grande	S. R. Ainslie	S. R. Ainslie	Denver, Col.
Denver, South Park & Pacific	C. W. Fisher	Charles Wheeler	Denver, Col.
Des Moines, Adel & Western	C. N. Gilmore		Adel, Iowa.
Des Moines & Ft. Dodge	C. N. Gilmore	C. N. Gilmore	Des Moines, Ill.
Detroit & Bay City	S. R. Callaway	Allan Bourn	Detroit, Mich.
Detroit, Gr. Haven & Milwaukee	W. J. Morgan	John S. Lorimer	Detroit, Mich.
Detroit, Hillsdale & Southwestern	W. F. Parker		Ypsilanti, Mich.
Detroit, Lansing & Northern	J. B. Mulliken	Allan Bourn	Detroit, Mich.
Dorchester & Delaware	J. M. Murphy		Cambridge, Md.
Dunkirk, Allegheny Val. & Pitts	D. Thayer		Dunkirk, N. Y.
Dunkirk, Allegheny Val. & Pitts		C. V. Deforest	New York City.
E			
East Broad Top	A. W. Sims		Orbisonia, Pa.
East Alabama & Cincinnati	W. W. Barnes		Opelika, Ala.
East Line & Red River	W. B. Ward		Jefferson, Tex.
East Tenn., Virginia & Georgia	**J. F. O'Brien	J. F. O'Brien	Knoxville, Tenn.
Eastern	**D. W. Sanborn	Geo. J. Fisher	Boston, Mass.
Eastern Kentucky	H. W. Bates	H. W. Bates	Riverton, Ky.
Eastern Kentucky	Geo. Noble		Riverton, Ky.
Eastern Shore	W. Thompson		Prince Anne, Md.
Erie & Pittsburg	J. M. Kimball		Erie, Pa.
Erie & Pittsburg	*J. D. Layng	Wm. Mullins	Pittsburg, Pa.
Eureka & Palisade	P. Evarts		Palisade, Nev.
European & North American	F. W. Cram		Bangor, Maine.
Evansville & Terre Haute	J. E. Martin	Jno. L. White	Evansville, Ind.
Evansville, Terre Haute & Chi	Jos. Collett	W. D. Macfarland	Terra Haute, Ind.
F			
Fitchburg	John Adams	F. S. Pratt	Boston, Mass.
Vermont & Mass. Div.	‡E. K. Turner		Fitchburg, Mass
Flint & Pere Marquette	Sanford Keeler	G. C. Cook	E Saginaw, Mich.
Florida Central	W. M. Davidson	W. M. Davidson	Jacksonville, Fla.
Flushing, North Shore & Central	Samuel Spencer	Samuel Spencer	L'g Isl'd C'y, N. Y.
Fonda, Johnstown & Gloversville	L. Caten		Gloversville, N. Y.
Fon du Lac, Amboy & Peoria	A. Kinyon		Fond du Lac, Wis.
Fort Madison & Northwestern	S. B. Kenrick	S. B. Kenrick	Fort Madison, Ia
Fort Wayne & Jackson	M. D. Woodford	M. D. Woodford	Jackson, Mich.
Fort Wayne, Muncie & Cincinnati	W. W. Worthington & P. Ag't		Fort Wayne, Ind.
Foxburg, St. Petersburg & Clarion	Benj. B. Newton		Foxburg, Pa.
Frankfort & Kokomo	E. H. Waldron		Frankfort, Ind.
Fredericton	F. B. Edgecombe		Fredericton, N. B.
Freehold & New York	J. E. Ralph		Freehold, N. J.
G			
Gal., Harrisburg & San Antonio	James Converse		Houston, Texas.
Gal., Houston & Henderson	*W. H. Harding	W. H. Harding	Palestine, Texas.
Geneva, Ithaca & Sayre	Wm. Stevenson		Sayre, Pa.
Georgia	S. K. Johnson	S. K. Johnson	Augusta, Ga.
Grand Haven	*F. H. May	F. H. May	Allegan, Mich.
G. Rapids, Newaygo & L. Shore	C. Warner		G. Rapids, Mich.
Grand Rapids & Indiana	W. O. Hughart, Pres't	W. R. Shelby	G. Rapids, Mich.
Northern Division	J. M. Matheany		G. Rapids, Mich.
Southern Division	P. S. O'Rourke		Fort Wayne, Ind.
Grand Trunk	*J. Hickson	John Taylor	Montreal, Canada.
Grand Trunk	W. J. Spicer		Montreal, Canada.
Grand Tower & Carbondale	T. M. Williamson	Wm. W. Harris	Grand Tower, Ill.
Grayville & Mattoon	*G. L. Bradbury		Mattoon, Ill.
Grayville & Mattoon	G. R. Cobleigh		Mattoon, Ill.
Great Western (Canada)	Charles Stiff		Hamilton, Ont.
Great Western (Canada)		G. R. Nash	London, Ont.
Green Bay & Minnesota	*Timothy Case		Green Bay, Wis.
Greenville & Columbia	J. W. Fry		Columbia, S. C.
Greenville, Col. & Birmingham	E. P. Buell		Greenville, Miss.
Greenwich & Johnsonville	H. H. Warner		Greenwich, N. Y.
Gulf, Colorado & Santa Fé			Galveston, Texas.
Gulf, Western Texas & Pacific	M. D. Monserrate		Cuero, Texas.
H			
Hamilton & Northwestern	*F. W. Cumberland		Hamilton, Ont.
Hannibal & St. Joseph	W. R. Woodward	T. L. Dunn	Hannibal, Mo.
Hannibal & St. Joseph	W. R. Woodward		Hannibal, Mo.
Eastern Division			Hannibal, Mo.
Western Division	W. C. Alberger		Kansas City, Mo.
Hanover Junction & Gettysburg	Henry A. Young		Hanover, Pa.
Harlem Extension South	*R. C. Root		Bennington, Vt.
Havana, Rantoul & Eastern	H. E. Bullock	H. E. Bullock	Rantoul, Ill.
Housatonic	L. B. Stillson	D. L. Draper	Bridgeport, Conn.
Houston, East & West Texas			Houston, Texas.
Houston & Texas Central	A. H. Swanson	A. H. Swanson	Houston, Texas.
Southern Division	M. G. Howe		Houston, Texas
Northern Division	G. A. Quinlan		Corsicana, Texas.
Huntingdon & Broad Top	Geo. F. Gage	S. B. Knight	Huntingdon, Pa.
I			
Illinois Central	E. T. Jeffrey	O. Ott	Chicago, Ill.
Chicago Division	C. A. Beck		Centralia, Ill.
Northern Division	J. C. Jacobs		Amboy, Ill.
Iowa Division	D. W. Parker		Dubuque, Ia.
Springfield Division	T. J. Hudson		Springfield, Ill.
Illinois Midland	L. Genis, *Rec.*	J. G. Clifford	Terre Haute, Ind.
Illinois & St. Louis	C. H. Sharman		St. Louis, Mo.
Indiana, Bloomington & Western	I. D. Barton	H. C. Norton	Indianapolis, Ind.
Indianapolis, Decatur & Spring.	E. H. Goodrich		Indianapolis, Ind.
Indianapolis & St. Louis	E. B. McClure	H. W. Comstock	Indianapolis, Ind.
Indianapolis, Peru & Chicago	§§E. C. Murphy		Indianapolis, Ind.
Indianapolis, Peru & Chicago		John Mc Kenna	Peru, Ind.
Indianapolis & Vincennes	J. J. Turner		Indianapolis, Ind
Intercolonial	D. Pottinger	L. B. Archibald	Moncton, N. B.
Halifax & St. John Division	Jas. Coleman		Truro, N. S.
Northern Division	M. Busby		Campbellt'n, N. B.
International & Great Northern	*H. M. Hoxie	H. M. Hoxie	Galveston, Texas.
Iowa Eastern	H. H. Kerr		Beulah, Iowa.
J			
Jacksonville, N. Western & S. E.	E. S. Greenleaf		Jacksonville, Ill.
Jacksonville, Pen. & Mobile		J. D. Hollister	Tallahassee, Fla.
Jeff., Madison & Indianapolis	E. W. McKenna		Louisville, Ky.
Jeff., Madison & Indianapolis		Wm. Mullins	Pittsburg, Pa.
Junction & Breakwater	Tho. Groome		Lewes, Del.
K			
Kansas Central	W. A. Martin	W. A. Martin	Leavenworth, Kan.
Kan. City, Burlington & Santa Fe	James Houston		Burlington, Kan.
Kansas City, Fort Scott & Gulf	L. W. Towne	Geo. H. Nettleton	Kansas City, Mo.
Kansas City, Lawrence & South	L. W. Towne	Geo. H. Nettleton	Kansas City, Mo.
Kan. City, St. Joseph & C. Bluffs	J. F. Barnard		St. Joseph, Mo.
Kan. City, St. Joseph & C. Bluffs			Kansas City, Mo.
Kansas City & Eastern	H. Hale		Independence, Mo
Kansas Pacific	*S. H. H. Clark	A. D. Clark	Omaha, Neb.
Kansas Pacific	S. T. Smith		Kansas City, Mo.
Kaw Valley Division	J. O. Brinkerhoff		Kansas City, Mo.
Smoky Hill Division	J. T. Odell		Ellis, Kansas.
Denver Division	J. T. Odell		Denver, Col.
Cheyenne Division	A. A. Egbert		Denver, Col.
Kent Co. & Smyrna & Del. Bay	J. F. Bingham		Chestertown, Md.
Kentucky Central	J. R. Ledyard		Covington, Ky.
Kingston & Pembroke	B. W. Folger	Wm. Harty	Kingston, Can.
Knox & Lincoln	C. A. Coombs	C. A. Coombs	Bath, Maine.
Knoxville & Ohio	G. J. Kinzel		Knoxville Tenn.
L			
Lake Erie & Western	*E. H. Waldron	E. H. Andress	Lafayette, Ind.
Sandusky Division	D. S. Hill		Fremont, Ohio.
Bloomington Division	M. Clark		Lafayette, Ind.
Lake Ontario Southern	*Jas. E. Briggs		Newark, N. Y.
Lake Shore & Mich. Southern	*John Newell		Cleveland, Ohio.
Lake Shore & Mich. Southern	Charles Paine	A. C. Armstrong	Cleveland, Ohio.
Buffalo & Erie Division	C. B. Couch		Cleveland, Ohio.
Toledo Division	Thos. Flesher, Jr		Cleveland, Ohio.
Michigan Division	J. E. Curtis		Toledo, Ohio.
Detroit Division	P. S. Blodgett		Detroit, Mich.
Western Division	J. H. Parsons		Chicago, Ill.
Lansing Division	T. J. Charlesworth		Lansing, Mich.
Franklin Division	Geo. H. McIntire		Stoneboro, Pa.
Lehigh Valley	Robert H. Sayre		Bethlehem, Pa.
Lehigh Valley		L. Chamberlin	Philadelphia, Pa.
Beaver Meadow Division	A. G. Brodhead, Jr		Mauch Chunk, Pa
Mahanoy Division	James I. Blakslee		Mauch Chunk, Pa.
New Jersey Division	H. E. Packer		Metuchen, N. J.
Wyoming Division	A. Mitchell		Wilkesbarre, Pa.
Levis & Kennebec	W. C. Hall		Quebec, Can.
Ligonier Valley	Thos. A. Mellon		East Liberty, Pa.
Little Rock & Fort Smith	T. Hartman		Little Rock, Ark.
Little Rock, Miss. River & Texas	J. A. Woodson	J. A. Woodson	Pine Bluff, Ark.
Los Angeles & Independence	§W. J. L. Moulton		Los Angeles, Cal.
Long Island	T. R. Sharp, Rec	R. M. Galloway	L'g Isla'd C'y, N. Y
Louisville & Nashville	*F. de Funiak		Louisville, Ky.
Louisville & Nashville	D. W. C. Rowland	G. C. Breed	Louisville, Ky.
St. L. & S. E. & N. & D. Div.	James Montgomery		St. Louis, Mo.
Memphis Line	J. T. Harrahon		Memphis, Tenn.
Nashville & Decatur Div	James Geddes		Nashville, Tenn.
So. & North Ala. Division	B. Dunham		Birmingham, Ala.
Louisville, Cincinnati & Lexington	Wm. Mahl	Wm. Mahl	Louisville, Ky.
Louisville, New Albany & Chicago	J. MacLeod	Wm. M. Lewis	Louisville, Ky.
Louisville, N. Albany & St. Louis	H. L. Shepherd		New Albany, Ind.
M			
Macon & Brunswick	Jas. M. Edwards	W. C. Jones	Macon, Ga.
Maine Central	Payson Tucker		Portland, Me.
Manchester & Keene	Charles E. Paige		Nashua, N. H.
Manchester & Lawrence	H. E. Chamberlin		Concord, N. H.
Manchester & North Weare	H. E. Chamberlin		Concord, N. H.
Manhattan Beach	A. Corbin, *Pres't*		New York, N. Y.
Manhattan Elevated	§§Frank K. Hain	M. K. King	New York, N. Y.
Eastern Division	Robert Stewart		New York, N. Y.
Western Division	T. T. Onderdonk		New York, N. Y.
Marietta & Cincinnati	Jas. H. Stewart	J. H. Stewart	Cincinnati, O.
Marquette, Hought'n & Ontonag'n	*Samuel Schoch		Marquette, Mich.
McKean & Buffalo	S. V. Godden		Smethport, Pa.
Memphis & Little Rock	Jas. Harrington		Memphis, Tenn.
Memphis & Little Rock	W. E. Smith		Memphis, Tenn.
Memphis & Charleston	John A. Grant	John A. Grant	Huntsville, Ala.
Memphis, Paducah & Northern	*N. Monsarrat	N. Monserrat	Paducah, Ky.
Michigan Air Line	*M. S. Hadley		Romeo, Mich.
Michigan Central	*H. B. Ledyard	Allan Bourn	Detroit, Mich.
Michigan Central	‡E. C. Brown		Jackson, Mich.
Mackinaw & Saginaw Div	W. A. Vaughan		Bay City, Mich.
Main L'e & G. R. & Kal. Div's	C. B. Bush		Jackson, Mich.
Middleburg & Schoharie	P. S. Demforth		Middleburg, N. Y.
Middletown & Crawford	D. Thompson		[Thompson, Ridge, N. Y
Midland of New Jersey	*H. M. Britton		Jersey City, N. J.
Midland Railway of Canada	H. G. Taylor		Port Hope, Ont.
Milwaukee, Lake Shore & West'n	H. G. H. Reed		Milwaukee, Wis.
Mineral Point	G. W. Cobb	G. W. Cobb	Mineral Point, Wis.
Mineral Range	*C. E. Holland		Hancock, Mich.
Minneapolis & St. Louis	*Chas. F. Hatch	Chas. F. Hatch	Minneapolis, Minn.
Minneapolis & St. Louis	E. W. Gaylord	E. W. Gaylord	Minneapolis, Minn.
Minnesota Midland	J. H. Lakey		Wabasha, Minn.
Mississippi & Tennessee	M. Burke	M. Burke	Memphis, Tenn.
Missouri, Iowa & Nebraska	Col. Henry Hill	J. FitzHenry	Alexandria, Mo.
Missouri, Kansas & Texas	*Abram Mitchell	G. M. Babcock	Sedalia, Mo.
Sedalia, Ft. S., & Neosho Div.	L. Pearson		Sedalia, Mo.
Cherokee & Choctaw Div	E. Harding		Denison, Tex.
Missouri Division	Geo. H. Huntington		Hannibal, Mo.
Fort Scott Division	L. Pearson		Sedalia, Mo.
Missouri Pacific	A. A. Talmage	R. B. Lyle	St. Louis, Mo.
Missouri Pacific	‡A. W. Dickinson		St. Louis, Mo.
Eastern Division	Miller Bullard		St. Louis, Mo.
Central Branch Division	W. W. Fagan		St. Louis, Mo.
Western Division	Warder Cumming		Sedalia, Mo.
Mobile & Alabama Grand Trunk	F. B. Clark, Prest		Mobile, Ala.
Mobile & Ohio	*A. L. Rives	A. L. Rives	Mobile, Ala.
Northern Division	E. S. Hosford		Jackson, Tenn.
Southern Division	C. Fleming		Mobile, Ala.
Mobile & Girard	W. L. Clark		Columbus, Ga.
Mobile & Montgomery	B. Dunham		Montgomery, Ala.
Mont Alto	G. B. Weistling		Mont Alto, Pa.
Montgomery & Eufaula	W. G. Raoul		Macon, Ga.

Railroad.	*Superintendent.*	*Purchasing Agent.*	*Residence.*
Montpelier & Wells River	W. A. Stowell		Montpelier, Vt.
Montrose	J. I. Blakslee	J. I. Blakeslee	Mauch Chunk, Pa
Morgan's Louisiana & Texas	Geo. Pandeley	C. A. Whitney & Co.	New Orleans, La.
Muncy Creek	H. R. Mehrling		Hughesville, Pa.
N			
Nashua, Acton & Boston	H. E. Chamberlin		Concord, N. H
Nashua & Lowell	Chas. E. Paige	Chas. E. Paige	Nashua, N. H.
Nashville, Chattanooga & St. Louis	J. C. Wrenne		Nashville, Tenn.
Natchez, Jackson & Columbus	J. H. Fitzpatrick		Natchez, Miss.
Naugatuck	Geo. W. Beach	Geo. W. Beach	Waterbury, Conn.
Nebraska	Wm. Irving		Omaha, Neb.
Nevada Central	*Jos. Collett		Battle Mountain, Nev.
Newburg, Dutchess & Connecticut	C. L. Kimball	C. L. Kimball	Dutchess J'n, N. Y.
New Brunswick & Canada	John Stewart		St. Stephen, N. B.
New Brunswick	Tho. Hoben	T. Burpee	Gibson, N. B.
New Canaan	Wm. St. John		New Canaan, Conn.
New Castle & Franklin	A. Vandivort		New Castle, Pa.
New Haven & Derby	E. S. Quintard		New Haven, Conn.
New Haven & Northampton	C. N. Yeamans	C. N. Yeamans	New Haven, Conn.
New Jersey & New York	J. D. Hasbrouck		Jersey City, N. J.
New Jersey Southern	W. S. Sneden		119 Lib. st., N. Y.
New Orleans & Selma	T. H. Du Puy		Selma, Ala.
New Orleans, Texas & Mobile	D. B. Robinson	John J. Howell	New Orleans, La.
New York, Lake Erie & Western	*Robert Harris		New York, N. Y.
New York, Lake Erie & Western	E. S. Bowen	J. A. Hardenbergh	New York, N. Y.
New York, Lake Erie & Western	‡O. Chanute		New York, N. Y.
New York, Lake Erie & Western	**P. P. Wright		Jersey City, N. J.
Eastern Division	E. O. Hill		Port Jervis, N. Y.
Delaware Division	Benj. Thomas		Port Jervis, N. Y.
Susquehanna Division	R. B. Cable		Elmira, N. Y.
Buffalo & Rochester Div	R. G. Taylor		Buffalo, N. Y.
Western Division	J. S. Beggs		Dunkirk, N. Y.
New York & Greenwood Lake	†Wm. P. Harris		Jersey City, N. J.
New York, New Haven & Hartford	*E. M. Reed	R. N. Dowd	New Haven, Conn.
N. Y. & N. H. Division	John T. Moody		New York, N. Y.
Hartford Division	C. S. Davidson		Hartford, Conn.
Shore Line Division	W. H. Stevenson		New Haven, Conn.
New York Central & Hudson Riv			
Hudson River & Harlem Div	J. M. Toucey	C. V. DeForest	New York, N. Y.
Eastern Division	Zenas C. Priest		Utica, N. Y.
Western Division	Geo. H. Burrows		Rochester, N. Y.
New York Central Division	Jas. Tillinghast		Albany, N. Y.
New York & Harlem	Chas. M. Bissell	R. C. Moore	New York, N. Y.
New York & New England	*Jas. H. Wilson	W. W. McKim	Boston, Mass.
Eastern Division			Boston, Mass.
Norwich Division	P. St. M. Andrews		Norwich, Conn.
Western Division	J. T. McManus		Hartford, Conn.
New York, Ontario & Western	*Theo. Houston		New York, N. Y.
New York, Ontario & Western	N. R. Hankin	Charles Clark	Middletown, N. Y.
Northern Division	C. W. Lanpher		Norwich, N. Y.
Southern Division	A. H. Danforth		Middletown, N. Y.
New York, Penn. & Ohio	P. D. Cooper	J. H. Holway	Cleveland, O.
First & Second Divisions	A. L. Dunbar		Meadville, Pa.
Third and Fourth Divisions	T. A. Phillips		Galion, O.
Mahoning Division	J. M. Ferris		Cleveland, O.
Northern Pacific	*H. E. Sargent	E. T. Williams	St. Paul, Minn.
Northern Pacific	H. A. Towne		Brainerd, Minn.
Pacific & P. Oreille Div	J. W. Sprague	J. W. Sprague	New Tacoma, W. T.
Missouri Division	D. R. Taylor		Mandon, Dak.
Northern of Canada	*F. W. Cumberland		Toronto, Can.
North Carolina	See Piedmont Air-Line.		
Northern Central	*Frank Thomson		Philadelphia, Pa.
Northern Central		A. W. Sumner	Baltimore, Md.
Baltimore Division	G. C. Wilkins		Baltimore, Md.
Elmira & Canandaigua Div	R. Neilson		Elmira, N. Y.
Susquehanna Division	W. A. Baldwin		Williamsport, Pa.
Northern (New Hampshire)	George F. Todd		Concord, N. H.
Northeastern (Georgia)	Lyman Wells		Athens, Ga.
Northeastern (South Carolina)	J. F. Devine		†Charleston, S. C.
North Pacific Coast	*John W. Doherty	W. F. Russell	San Francisco, Cal.
Northwestern Ohio	J. S. Morris		Toledo, O.
O			
Ogdensburg & Lake Champlain	W. W. Hungerford		Ogdensburg, N. Y.
Ohio Central	G. G. Hadley		Columbus, O.
Ohio & Mississippi	W. W. Peabody		Cincinnati, O.
Ohio & Mississippi		G. E. Atwood	St. Louis, Mo.
Eastern Division	C. B. Cole		Seymour, Ind.
Western Division	C. M. Stanton		St. Louis, Mo.
Louisville Division	C. Cole		Louisville, Ky.
Ohio & Toledo	N. A. Smith		Carrollton, O.
Old Colony	J. R. Kendrick	F. P. Moseley	Boston, Mass.
Northern Division	§S. A. Webber		Fitchburg, Mass.
Cape Cod Division	§C. H. Nye		Hyannis, Mass.
Main Line Division	§J. H. French		Boston, Mass.
Olean, Bradford & Warren	J. W. Watson		Oleon, N. Y.
Omaha & Republican Valley	P. J. Nichols		Omaha, Neb.
Omaha & Northern Nebraska	J. E. House		Omaha, Neb.
Oregon & California	J. Brandt, Jr	J. Brandt, Jr	Portland, Oregon.
Oregon Railway & Navigation Co.	G. J. Ainsworth		Portland, Oregon.
Owensboro & Nasaville	E. Culverhouse		Owensboro, Ky.
P			
Paducah & Elizabethtown	Robert Meek		Elizabethtown, Ky.
Painesville & Youngstown	**J. A. Newcome		Youngstown, O.
Parker & Karns City	W. C. Moberly		Parker City, Pa.
Peach Bottom	S. M. Manifold		York, Pa.
Paw Paw & Toledo & South Haven	John Ihing		Lawton, Mich.
Pennsylvania	*Frank Thomson	Enoch Lewis	Philadelphia, Pa.
Pennsylvania	Charles E. Pugh		Altoona, Pa.
Pennsylvania	**John Reilly		Altoona, Pa.
New York Division	James McCrea		Jersey City, N. J.
Amboy Division	I. S. Buckelew		Camden, N. J.
Belvidere Division	J. A. Anderson		Lambertville, N. J.
New Jersey Division	F. Wolcott Jackson		Jersey City, N. J.
Philadelphia Division	W. F. Lockard		Philadelphia, Pa.
Middle Division	S. M. Prevost		Harrisburg, Pa.
Pittsburg Division	Robert Pitcairn		Pittsburg, Pa.
Tyrone Division	S. S. Blair		Tyrone, Pa.
Bedford Division	Tho. A. Roberts		Harrisburg, Pa.
West Pennsylvania Division	E. B. Taylor		Allegheny City, Pa.
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Peoria & Springfield	J. R. Hilliard		Peoria, Ill.
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Reading & Columbia	Alex. M. Wilson		Columbia, Pa.
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Philadelphia & Baltimore Central	Henry Wood	Henry Wood	Philadelphia, Pa.
Philadelphia & Erie	Wm. A. Baldwin		Williamsport, Pa.
Philadelphia & Erie		Enoch Lewis	Philadelphia, Pa.
Western Division	J. W. Reynolds		Erie, Pa.
Middle Division	E. B. Westfall		Renovo, Pa.
Eastern Division	Thomas Gucker		Williamsport, Pa.
Danv., Haz. & W. Barre Div.	Joseph Crawford		Sunbury, Pa.
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Philadelphia, Newt'n & New York	L. L. Bush		Philadelphia, Pa.
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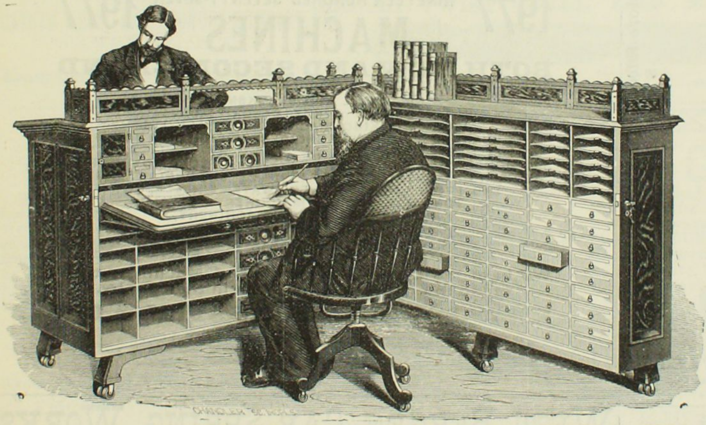

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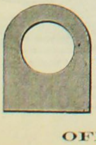

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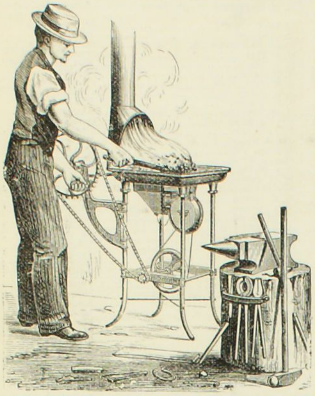

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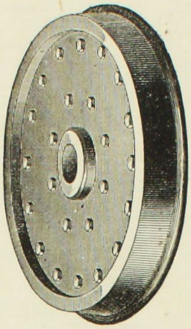

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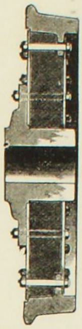

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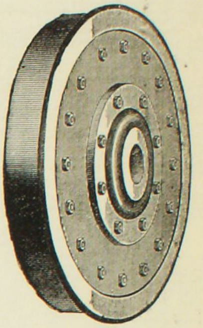

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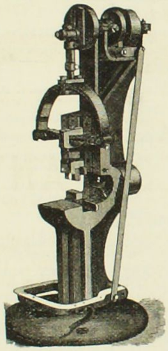

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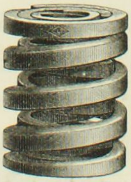

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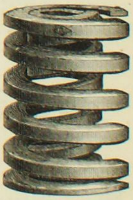

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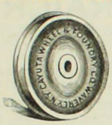

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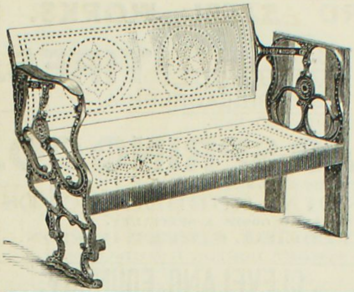

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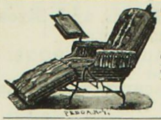

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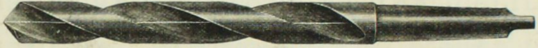

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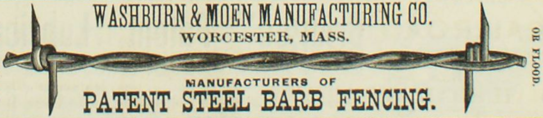

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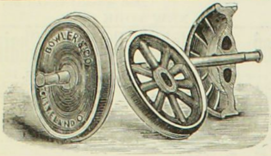
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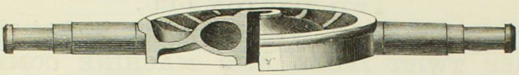

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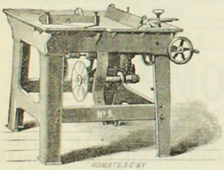

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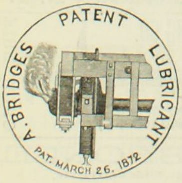

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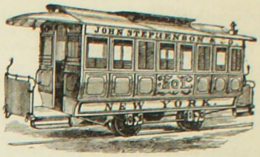

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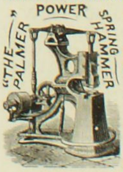

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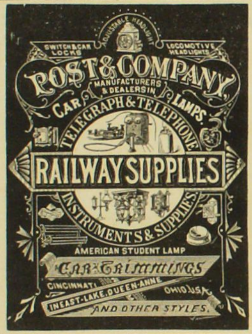
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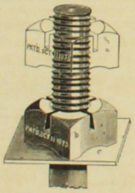
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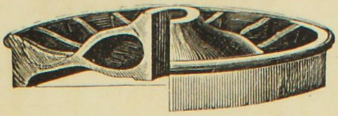

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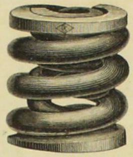

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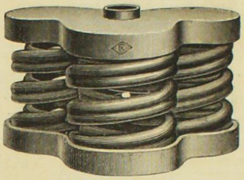

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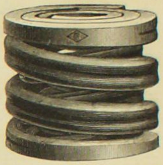

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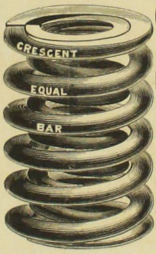
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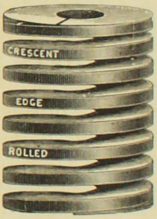
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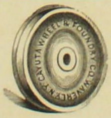

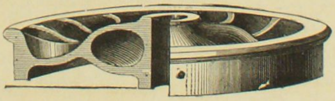

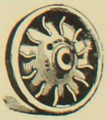

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